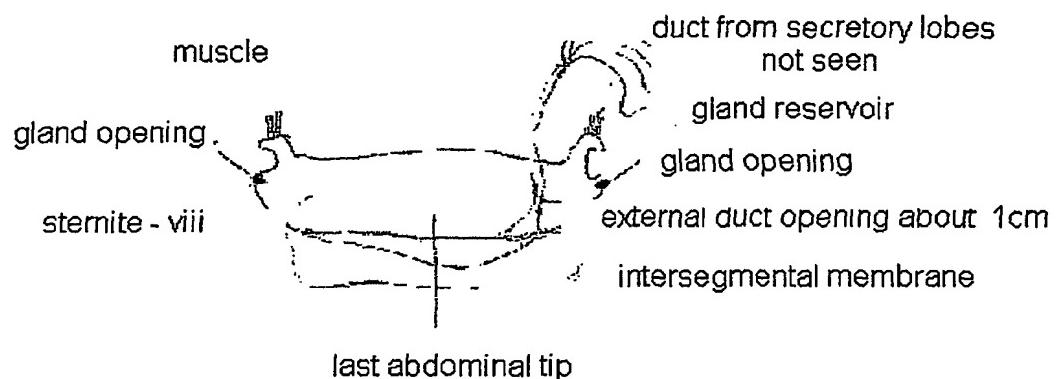
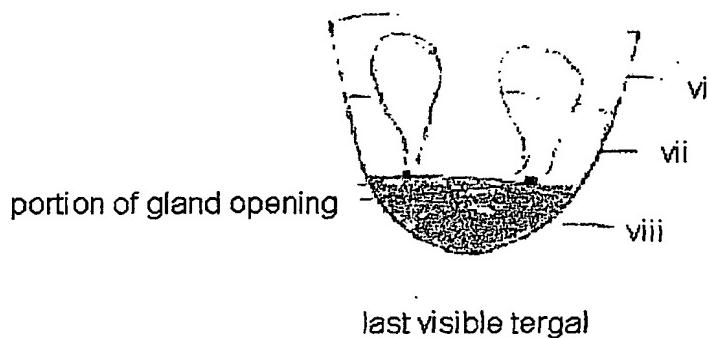


Figure 1**Ground beetle dissection to show the pygidial gland in *Pterostichus melanarius*****Dorsal abdominal tip end**

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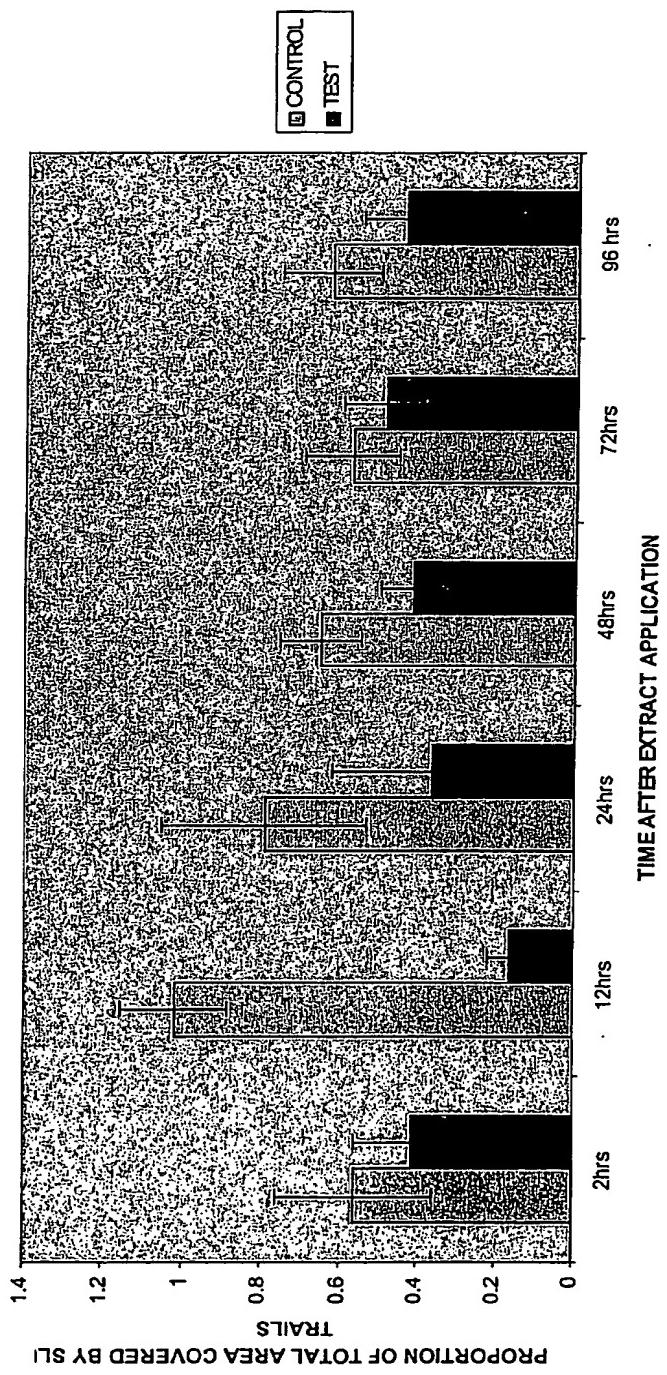
EFFECT OF THE TEST EXTRACT TAKEN FROM THE PYGIDIAL GLANDS OF *P.MELANARIUS* BEETLES ON SLUG ACTIVITY

FIGURE 2

The figure shows the proportion of the total area of the petri dish covered by the slug trails during a 24-hour period (arcsine transformed data with 95% confidence limits ($n = 10$ replicates). The trial was conducted in 2, 12, 24, 48, 72 and 96 hours after the extract was obtained. The test extract was prepared by using five *P. melanarius* beetles in 10ml methanol. A total of thirty beetles were used over the period of 4 days, for this experiment. Wt/vol = 1.73g/60ml.

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EFFECT OF THE TEST EXTRACT TAKEN FROM THE PYgidIAL GLANDS OF 5 P. CUPREUS BEETLES ON SLUG ACTIVITY

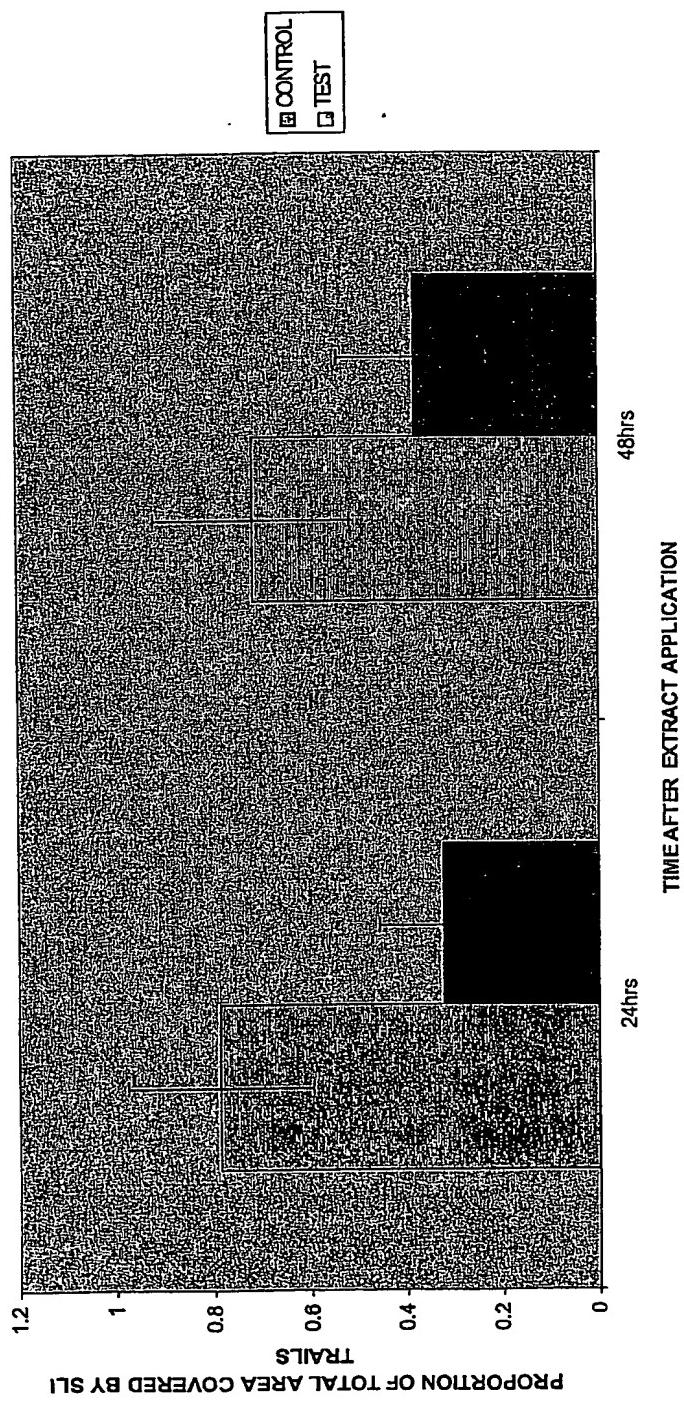


FIGURE 3

The figure shows the proportion of the total area of the petri dish covered by the slug trails during a 24-hour period (arcsine transformed data with 95% confidence limits ($n = 10$ replicates)). The trial was conducted in 24 and 48 hours, after the extract was obtained. The test extract was prepared by using five *P. cupreus* in 10ml methanol. A total of ten beetles were used over the period of 2 days, for this experiment. $W/vol = 0.26g/20ml$.

EFFECT OF THE TEST EXTRACT TAKEN FROM THE PYGIDIAL GLANDS OF 5 PTEROSTICHUS MADIDUS ON SLUG ACTIVITY

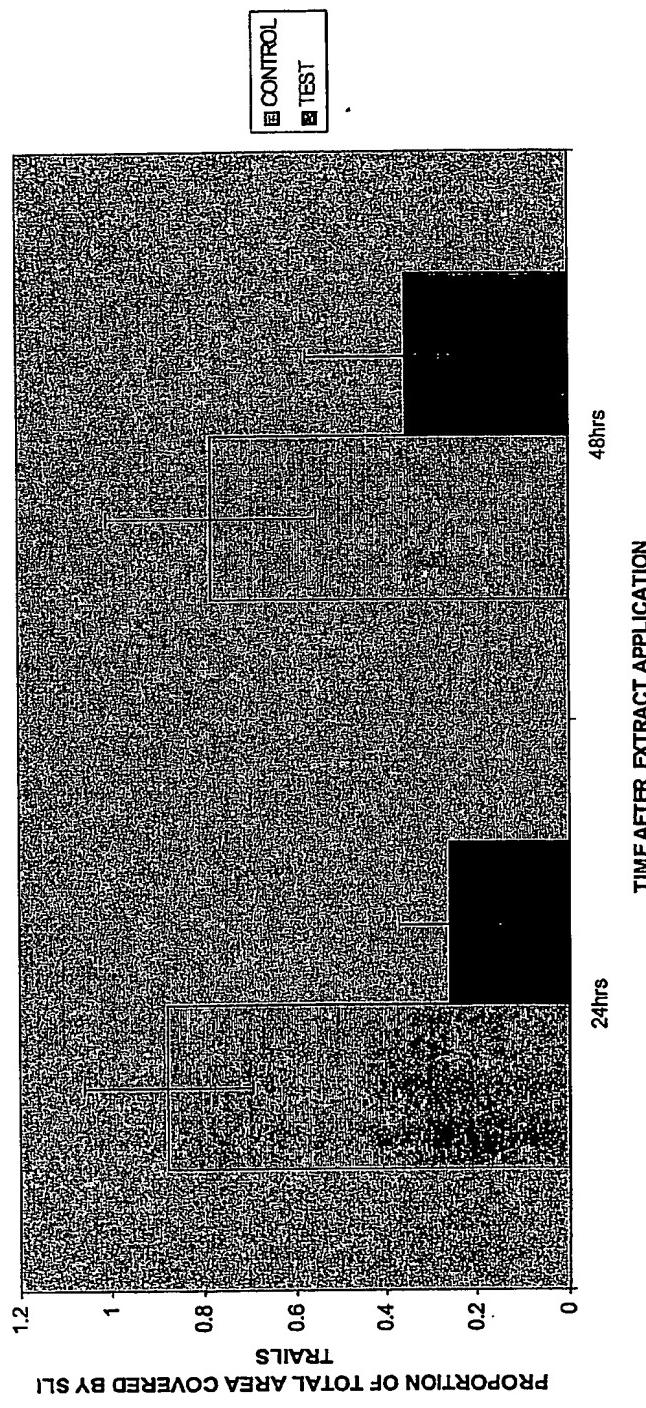


FIGURE 4 The figure shows the proportion of the total area of the petri dish covered by the slug trails during a 24-hour period (arcsine transformed data with 95% confidence limits ($n = 10$ replicates)). The trial was conducted over the period of 2 days, using a total of ten *P. madidus* in 20ml methanol. $W/v/vol = 0.53g/20ml$.

EFFECT OF THE TEST EXTRACT TAKEN FROM THE PYGIDIAL GLANDS OF 5 HARPALUS RUFFIPS BEETLES ON SLUG ACTIVITY

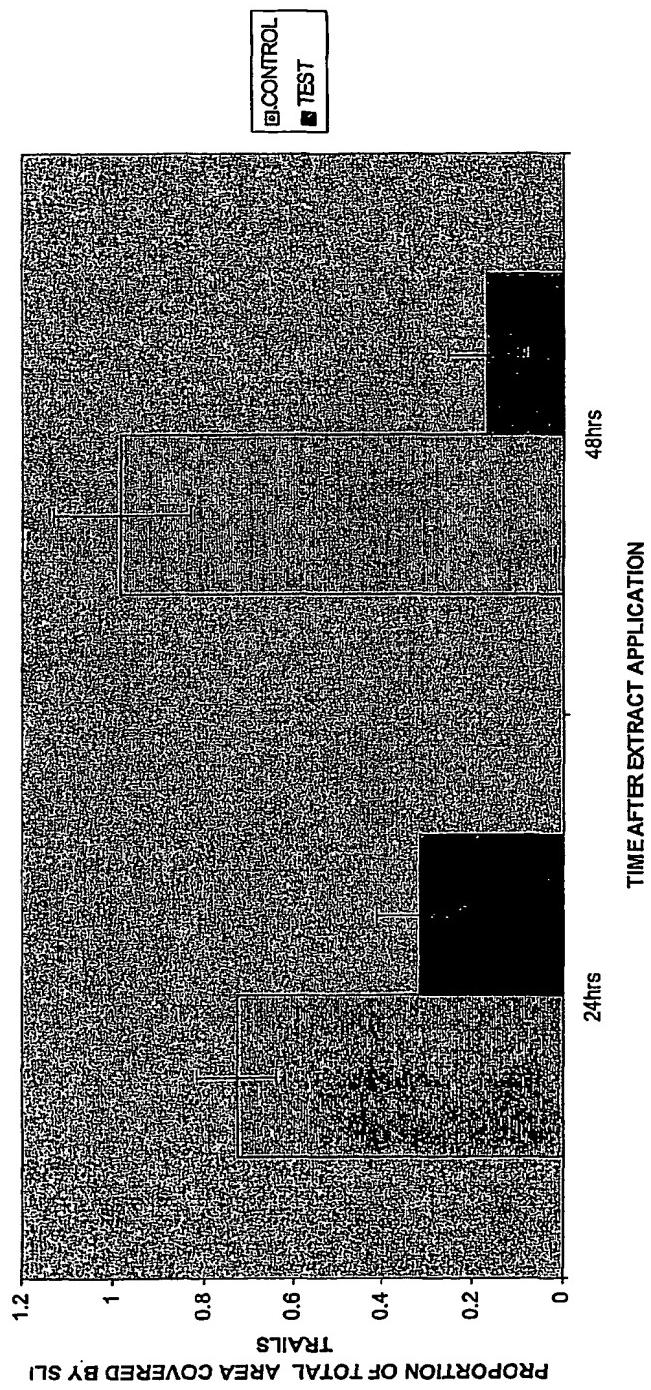


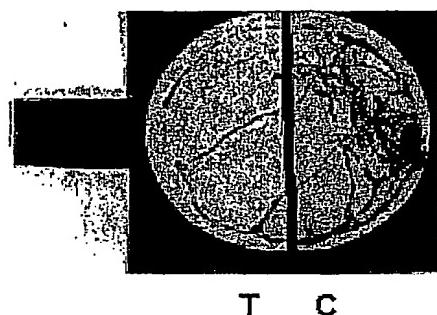
FIGURE 5

The figure shows the proportion of the total area of the petri dish covered by the slug trails during a 24-hour period (arcsine transformed data with 95% confidence limits ($n = 10$ replicates)). The trial was conducted over the period of 2 days as shown using a total of ten *Harpalus ruffips* in 20ml methanol. Wt/vol = 0.49 g/20ml.

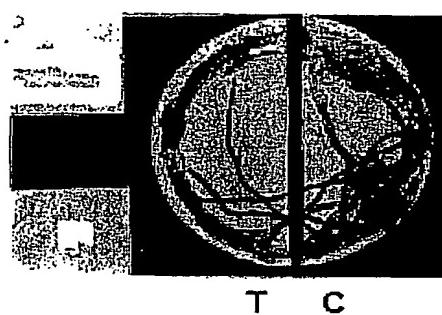
Figure 6

Photograph showing slug response to beetle extracts overnight using the arena test inside the petridishes

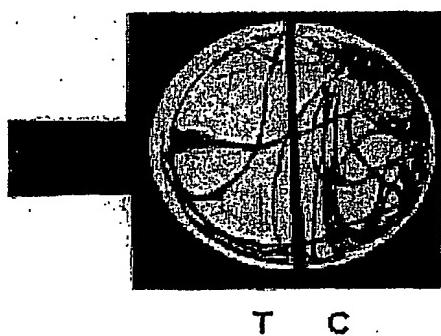
Pterostichus melanarius



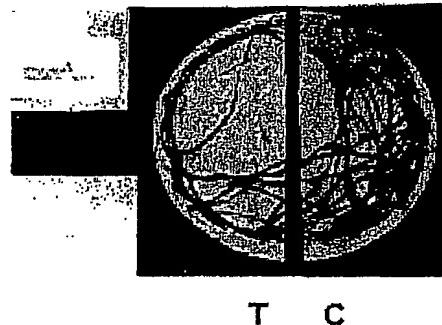
Pterostichus cupreus



Pterostichus madidus



Harpalus rufipes



The control and test sector is denoted by C and T under each specimen

**And yes beetle odours can be useful to deter slugs from
feeding onto growing pea plants**

Major glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 2 days on pea plants grown (6") in height and applied with methacrylic acid diluted in water (1/100) chi-sq = 32.45

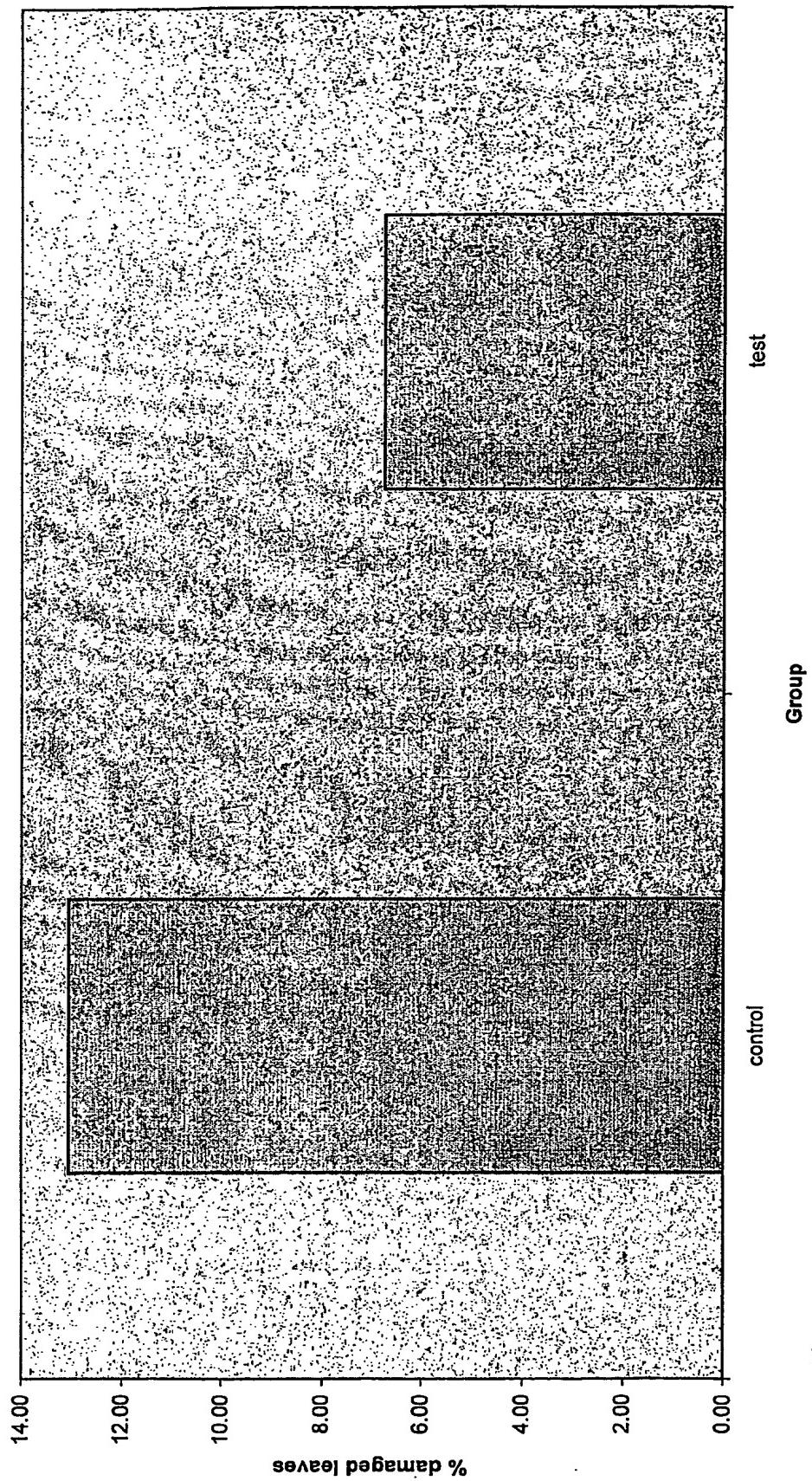


Fig 7

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 5 days on pea plants grown (6") in height and applied with methacrylic acid diluted in water (1/100) chl-sq = 37.774

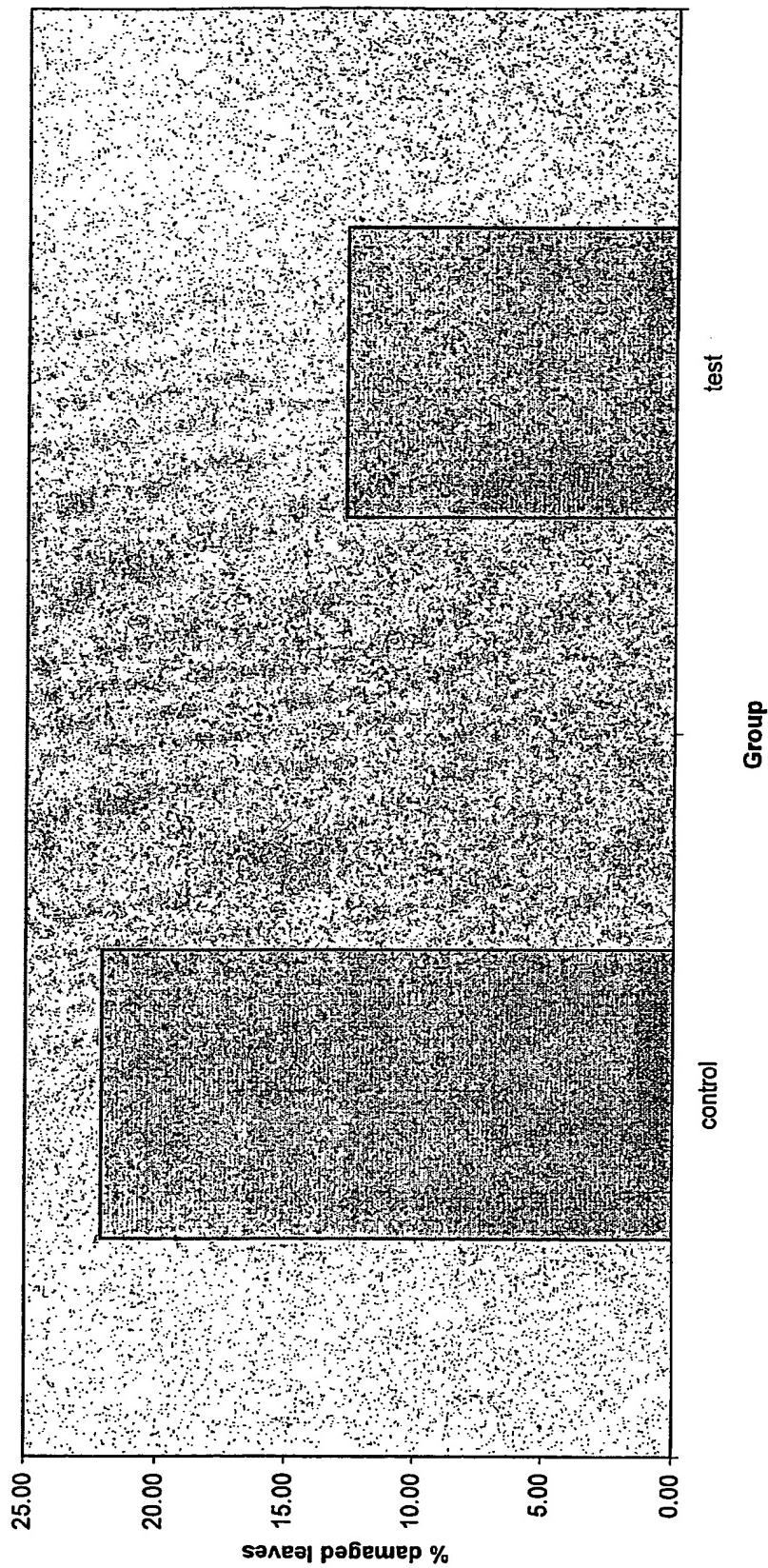


Fig 8

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 2 days on pea plants grown (6") in height and applied with crotonic acid diluted in water(1/100) chi-sq = 0.504

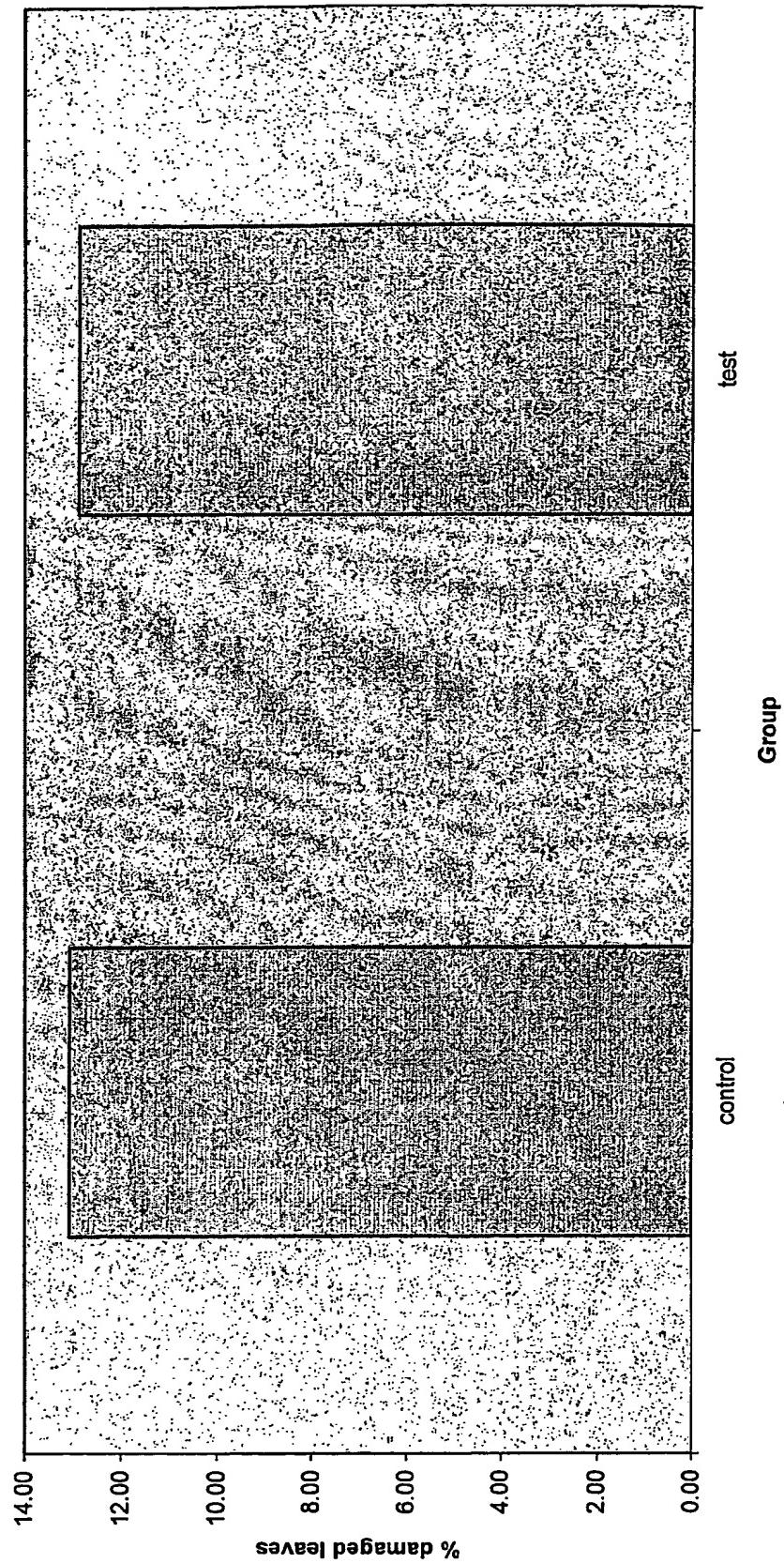


Fig 9

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 5 days on pea plants grown (6") in height and applied with crotonic acid diluted in water(1/100) chi-sq = 2.281

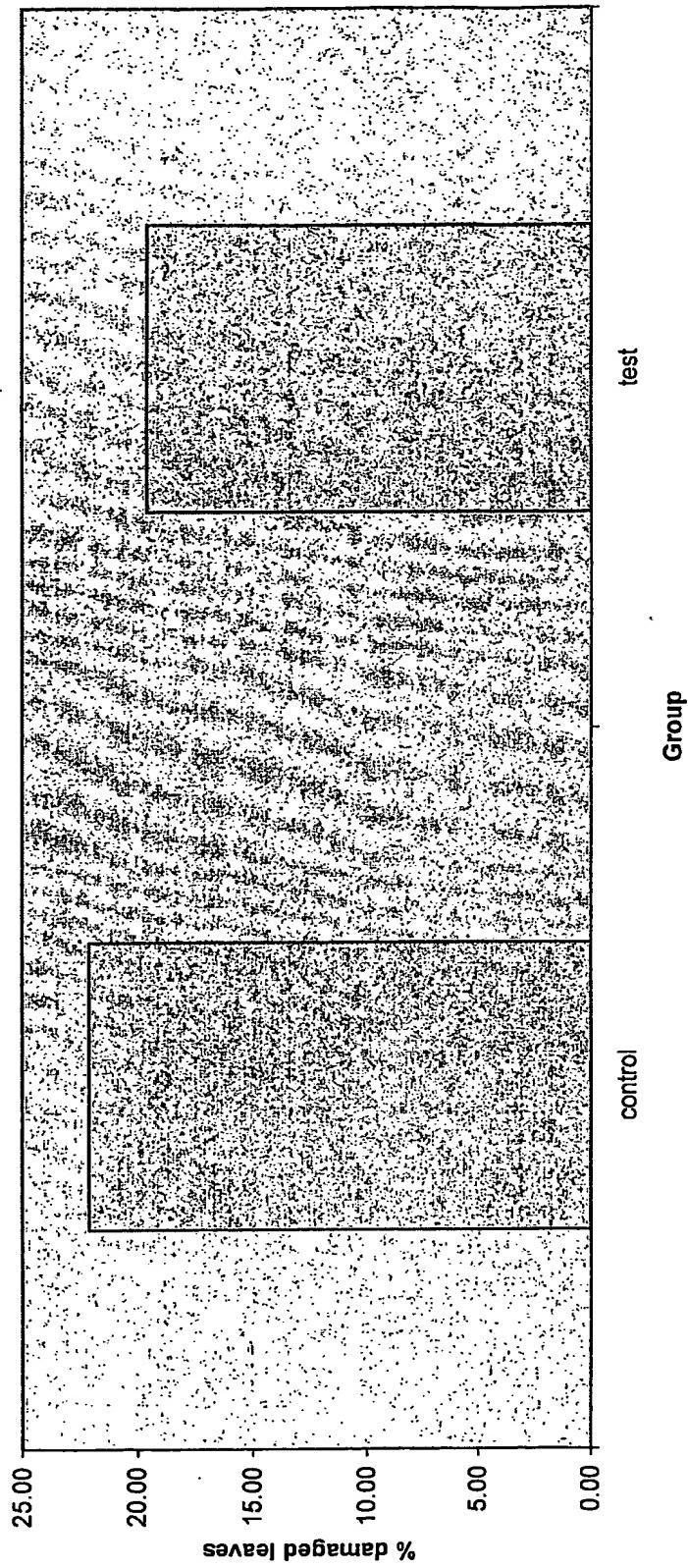


Fig 10

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 2 days on pea plants grown (6") in height and applied with acetic acid diluted in water (1/100) chi-sq =19.722

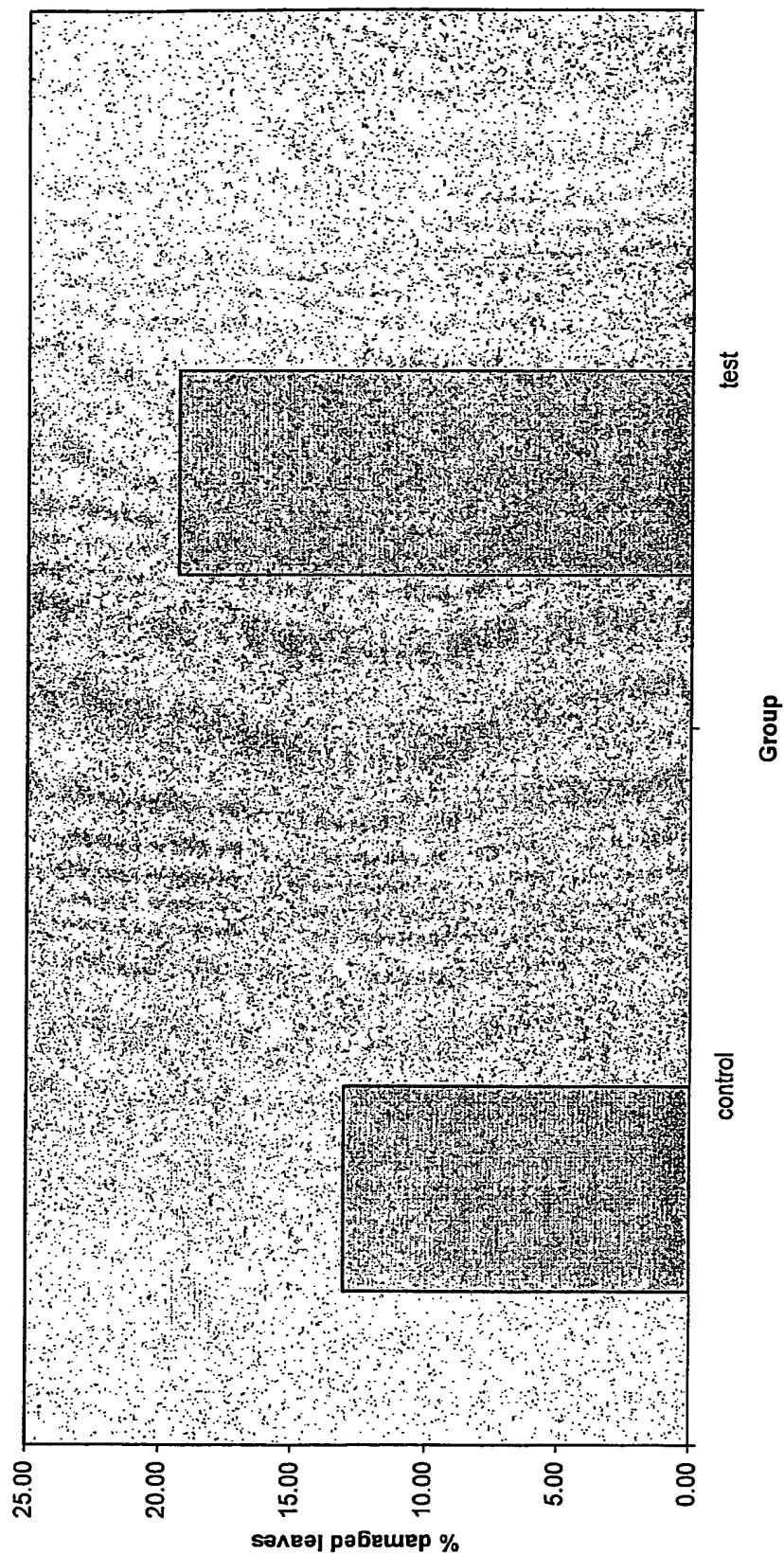
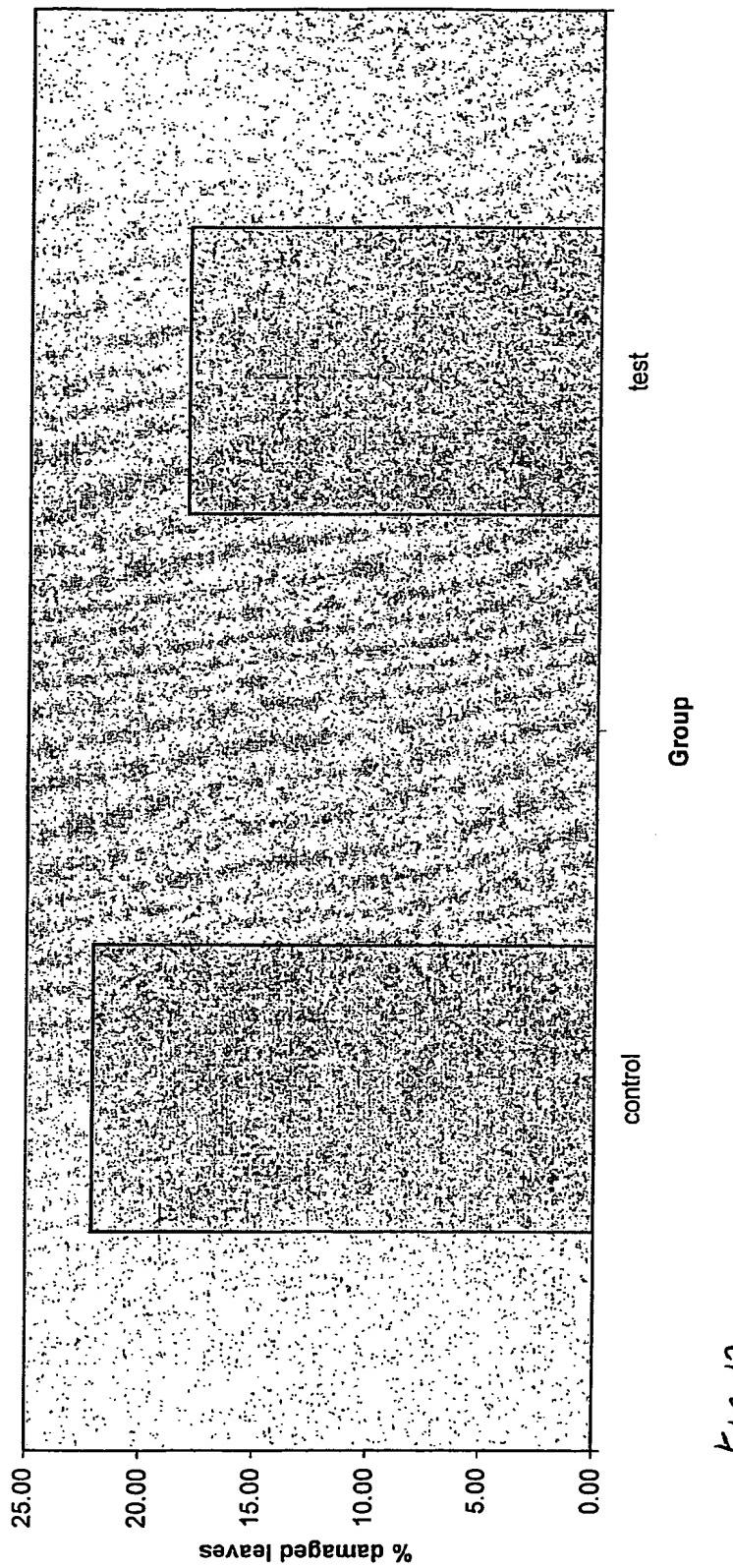
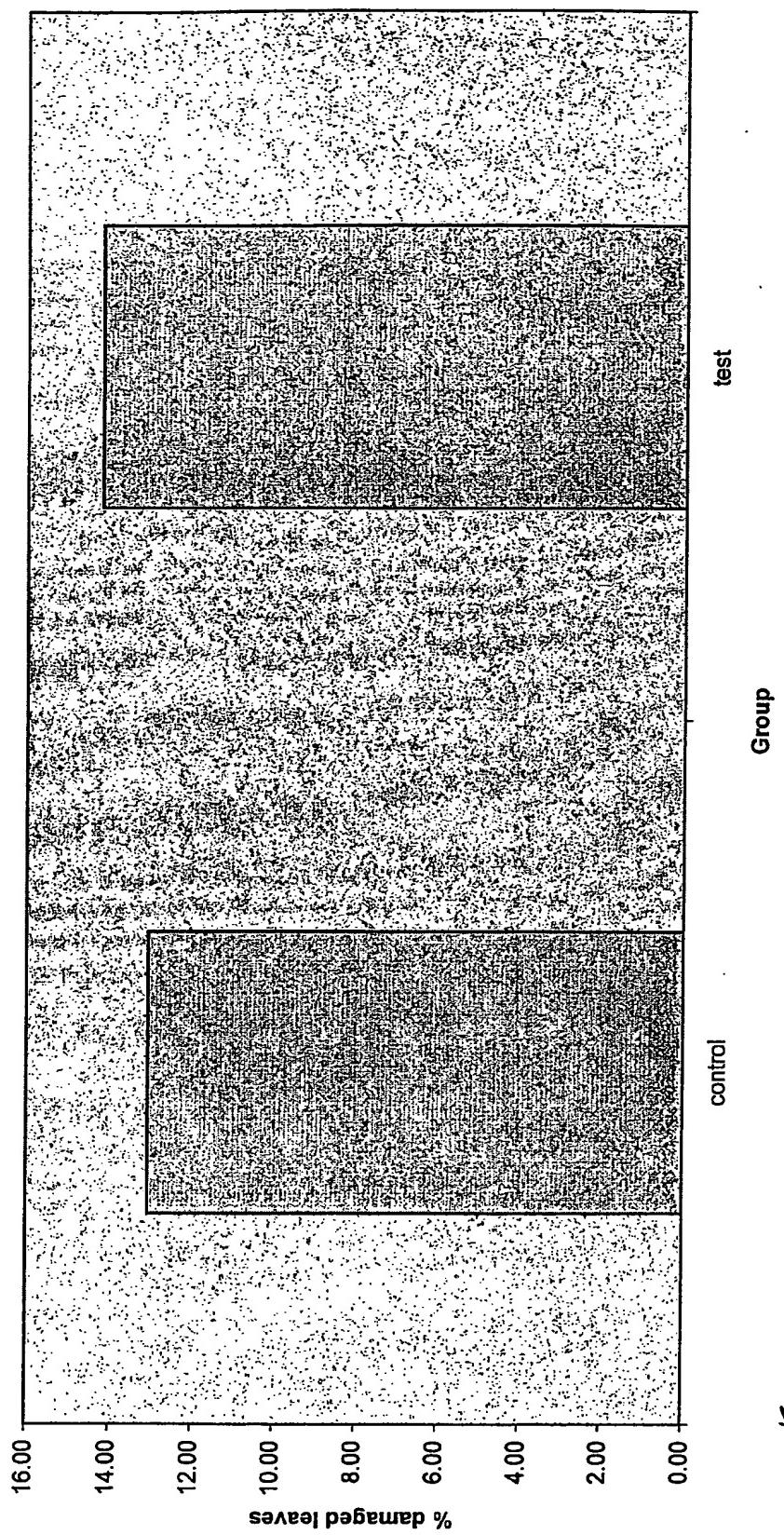


Fig 11

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 5 days on pea plants grown (6") in height and applied with acetic acid diluted in water (1/100) chi-sq = 5.601



Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 2 days on pea plants grown (6") in height and applied with tiglic acid diluted in water (1/100) chi-sq = 0.703



Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 5 days on pea plants grown (6") in height and applied with tiglic acid diluted in water (1/100) chi-sq = 4.085

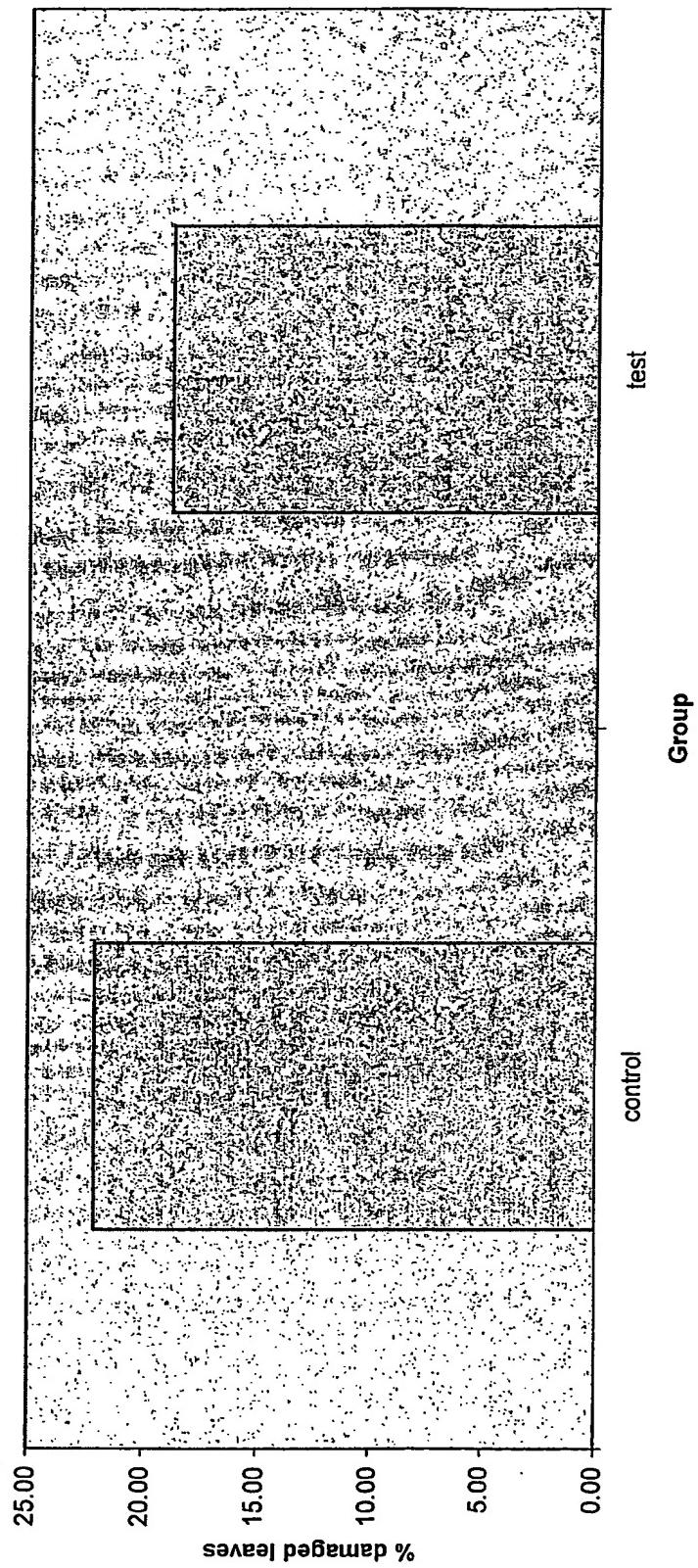


FIG 14

Major Glasshouse studies to show the effects of D.*reticulatum* slugs after a period of 2 days on pea plants grown (6") in height and applied with beetle formulations of P.*melanarius* (methacrylic and crotonic acid) diluted in water (1/100) chi-sq = 20.951

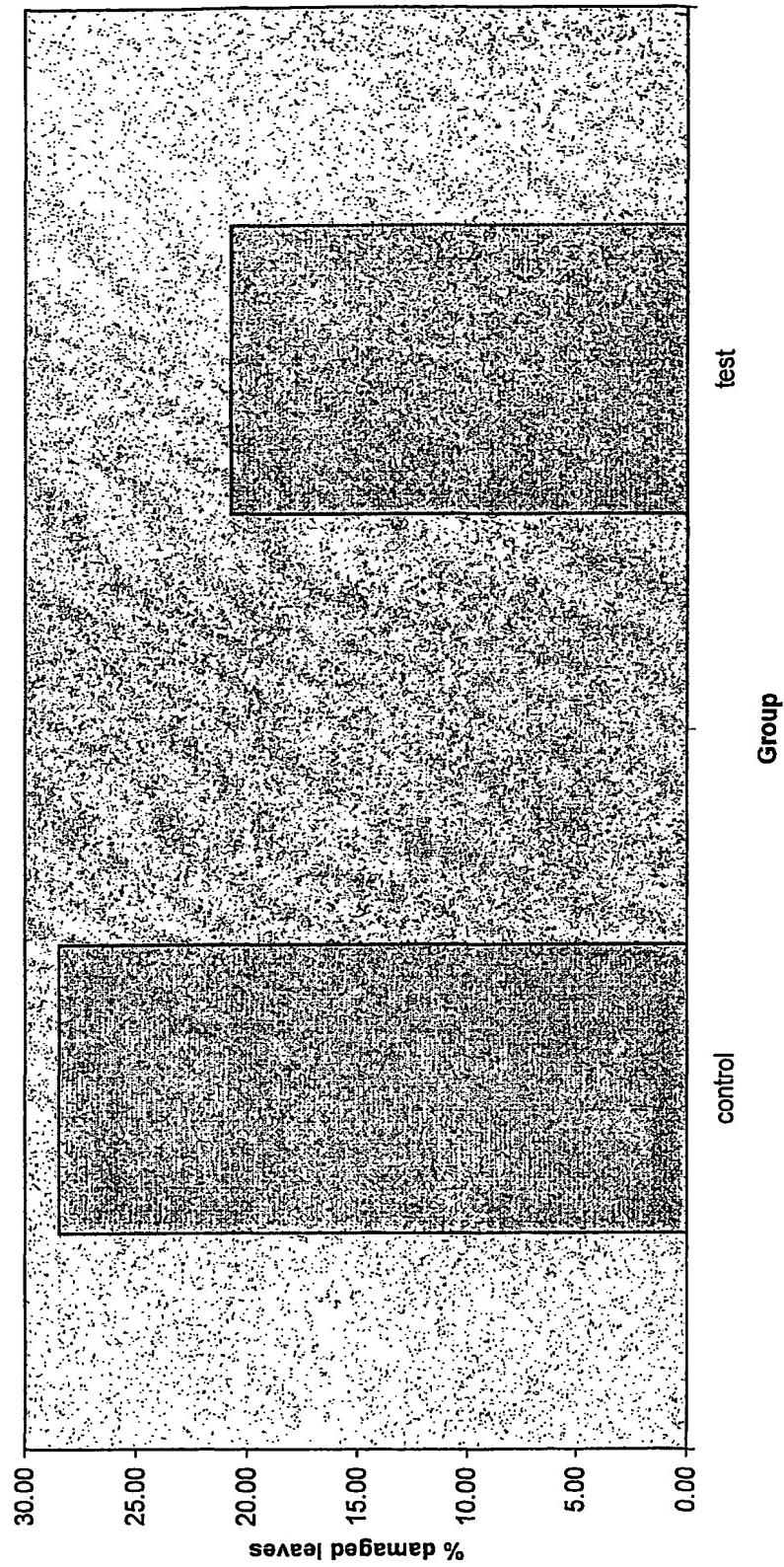


Fig 15

Major Glasshouse studies to show the effects of D.*reticulatum* slugs after a period of 5 days on pea plants grown (6") in height and applied with beetle formulations of P. melanarius (methacrylic and crotonic acid diluted in water (1/100) chi-sq = 6.753

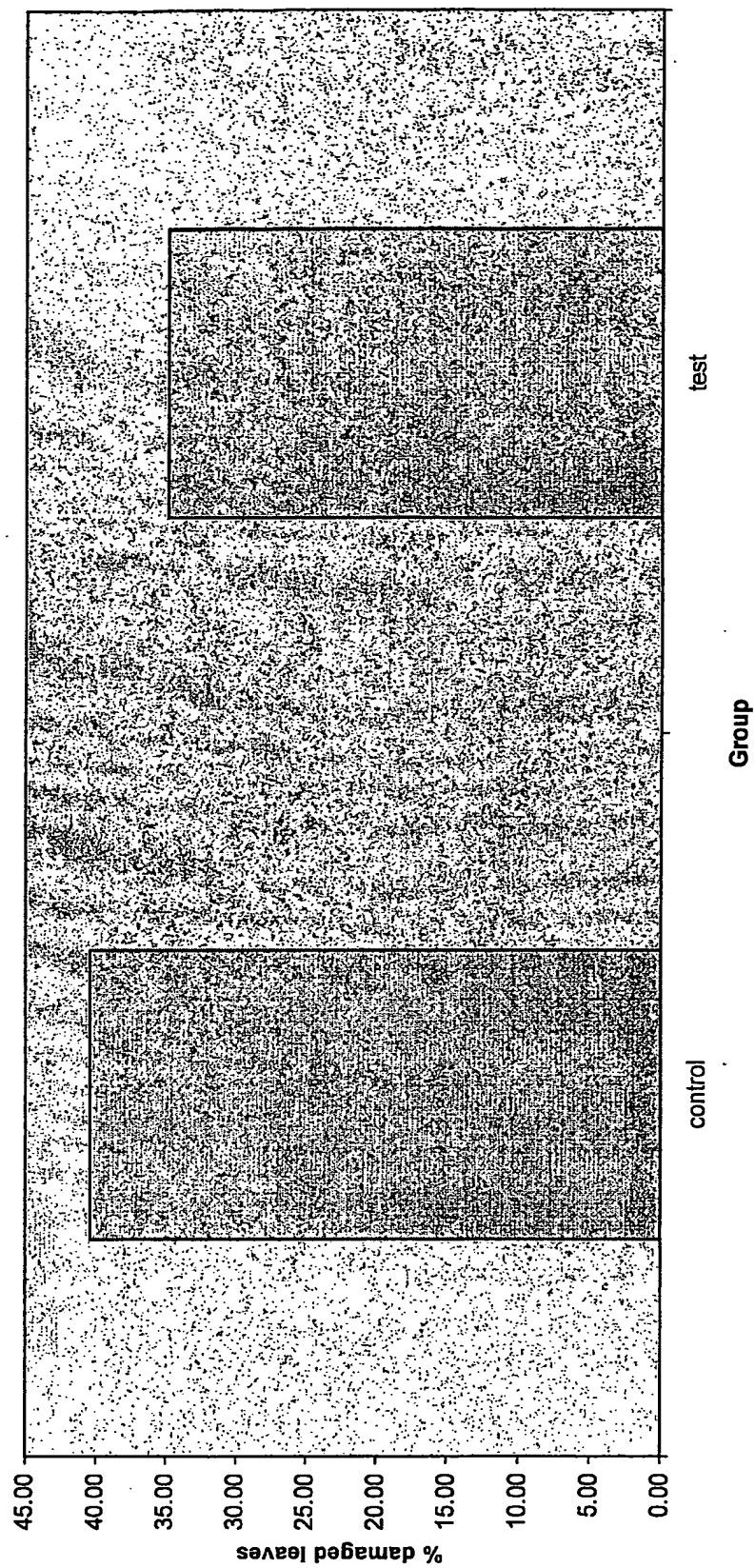
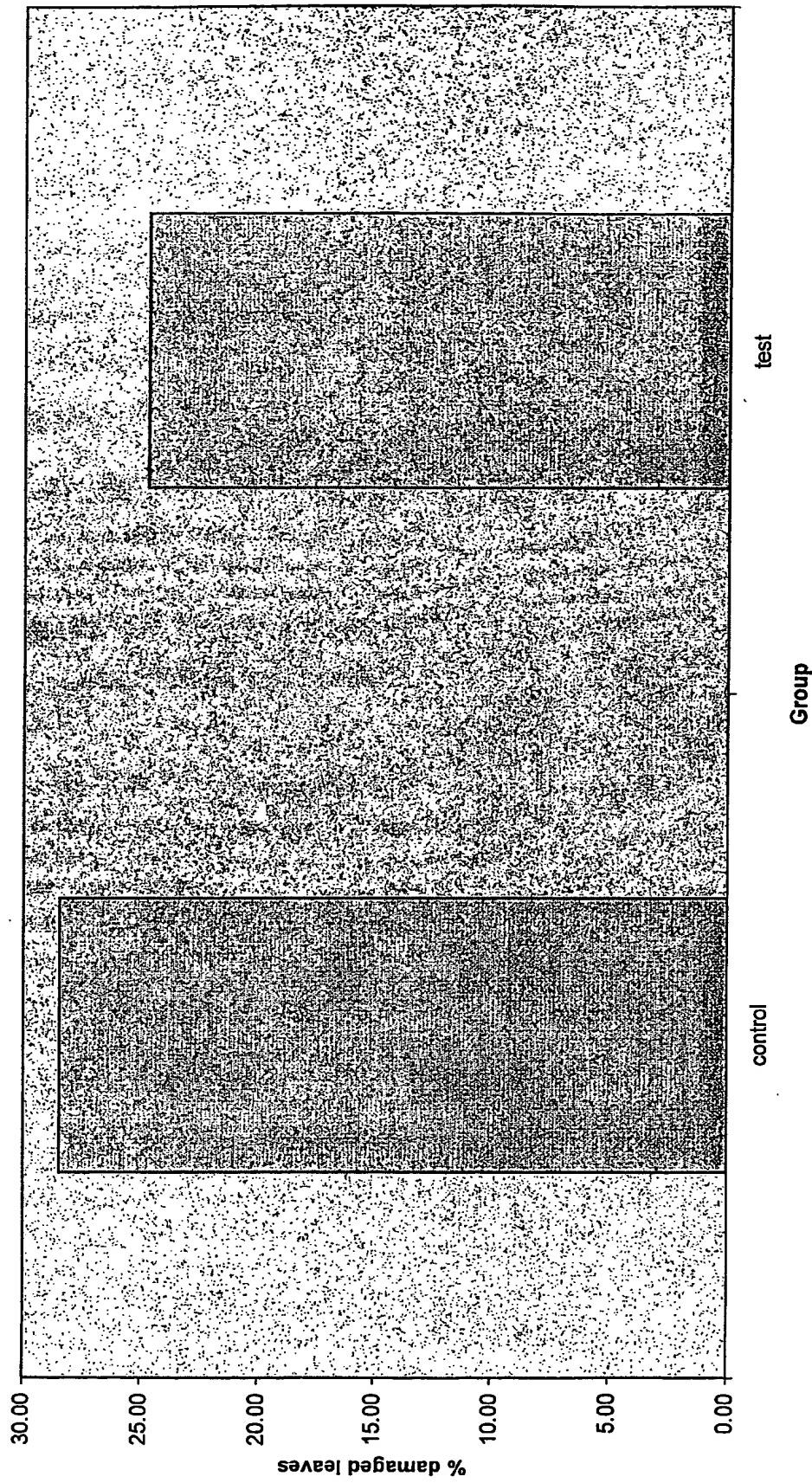


Fig 16

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 2 days on pea plants grown (6") in height and applied with beetle formulations of *P. cupreus* (acetic and crotonic acid) diluted in water (1/100) chi-sq = 4.473



F1g 17

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 5 days on pea plants grown (6") in height and applied with beetle formulations of *P. cupreus* (acetic and crotonic acid) diluted in water (1/100) chi-sq = 13.034

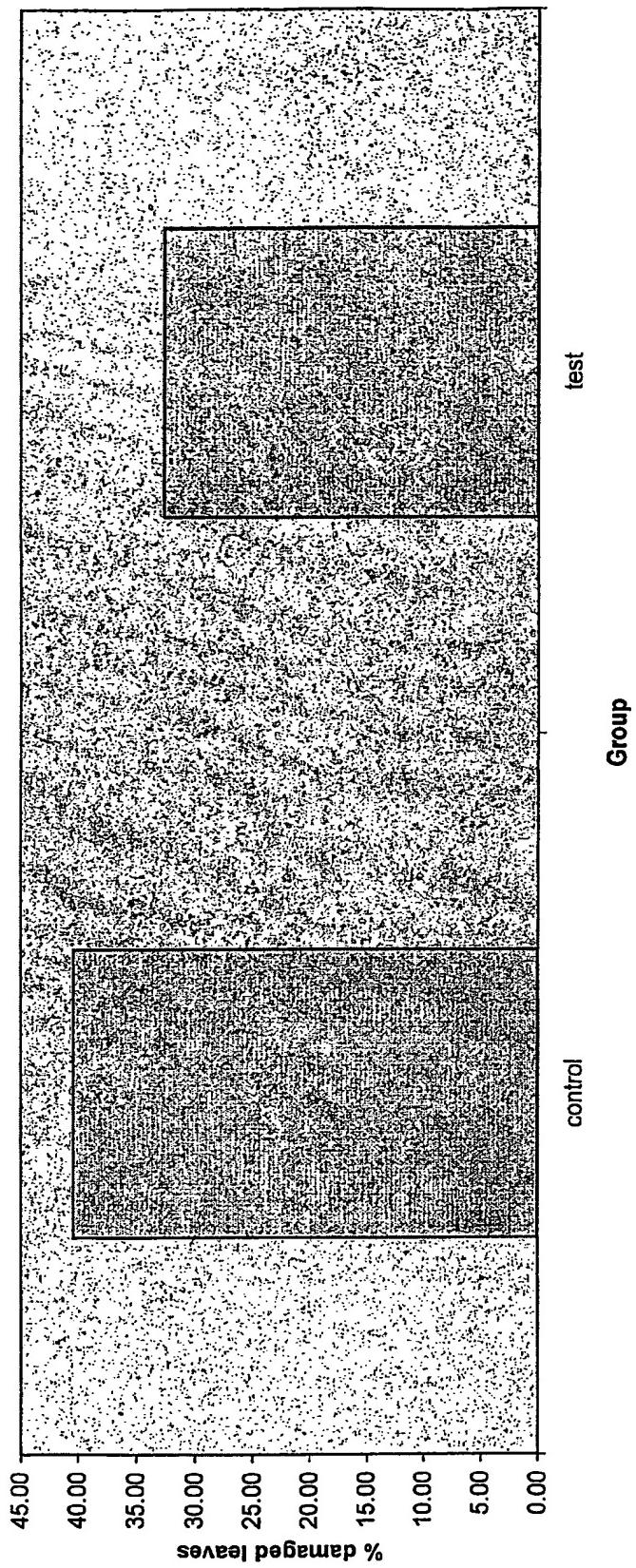
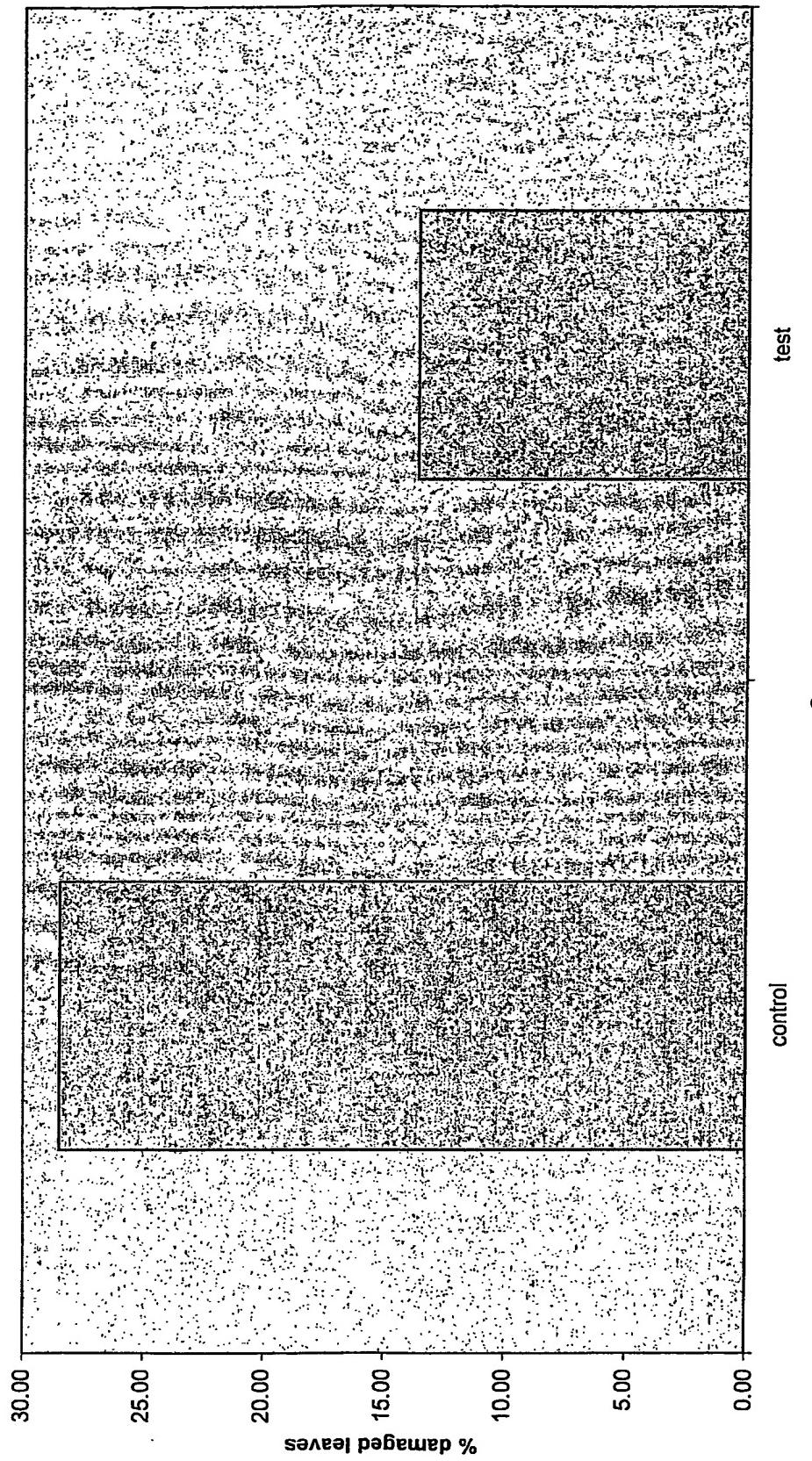


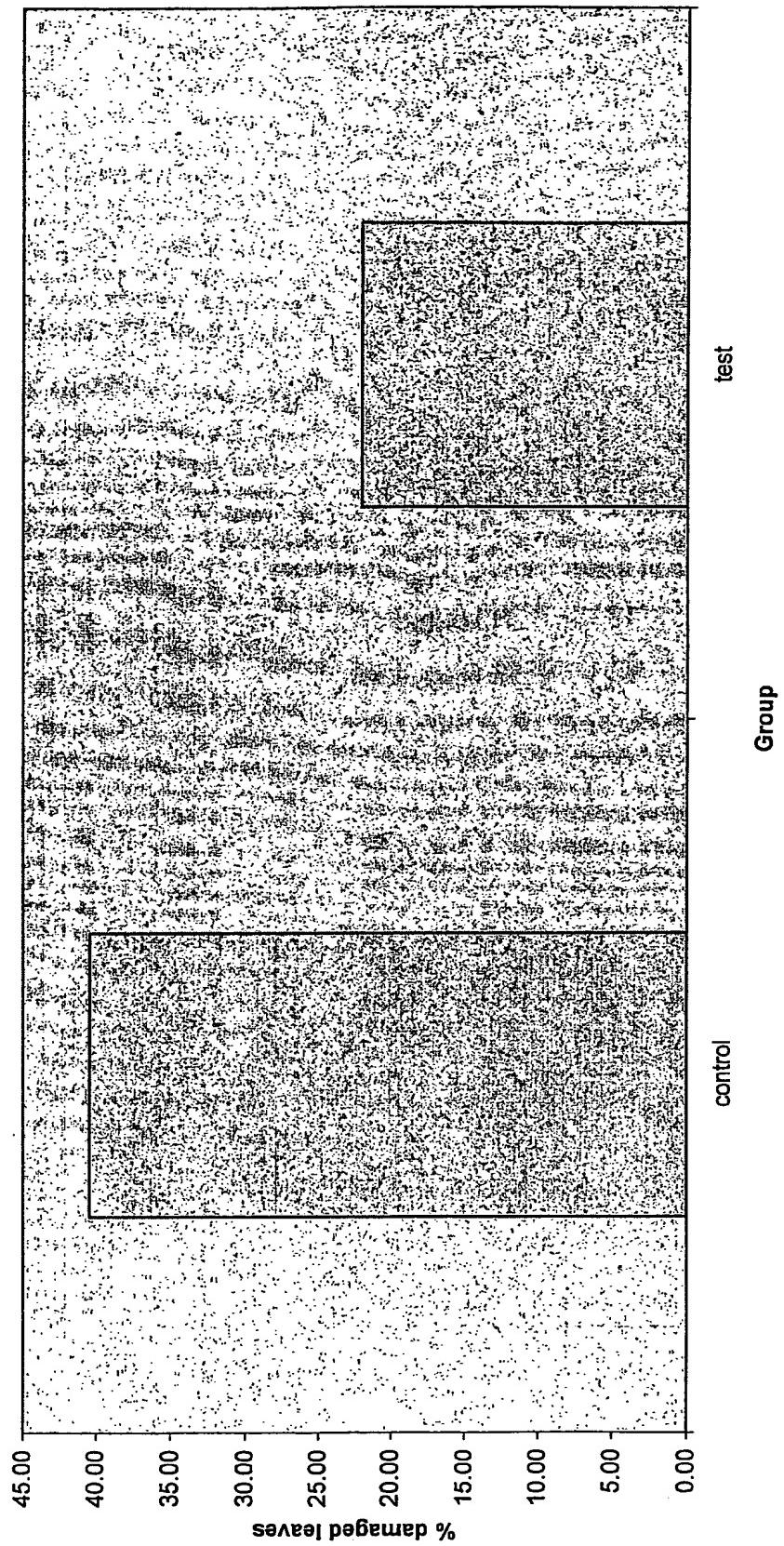
FIG 18

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 2 days on pea plants grown (6") in height and applied with beetle formulations of *H. rufipes* (formic acid) diluted in water (1/100) chi-sq = 89.743



F1G, 19

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 5 days on pea plants grown (6") in height and applied with beetle formulations of *H. rufipes* (formic acid) diluted in water (1/100) chi-sq = 79.168



F16, 20

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 2 days on pea plants grown (6") in height and applied with beetle formulations of *P. maidis* (methacrylic and tiglic acid) diluted in water (1/100) chi-sq = 90.665

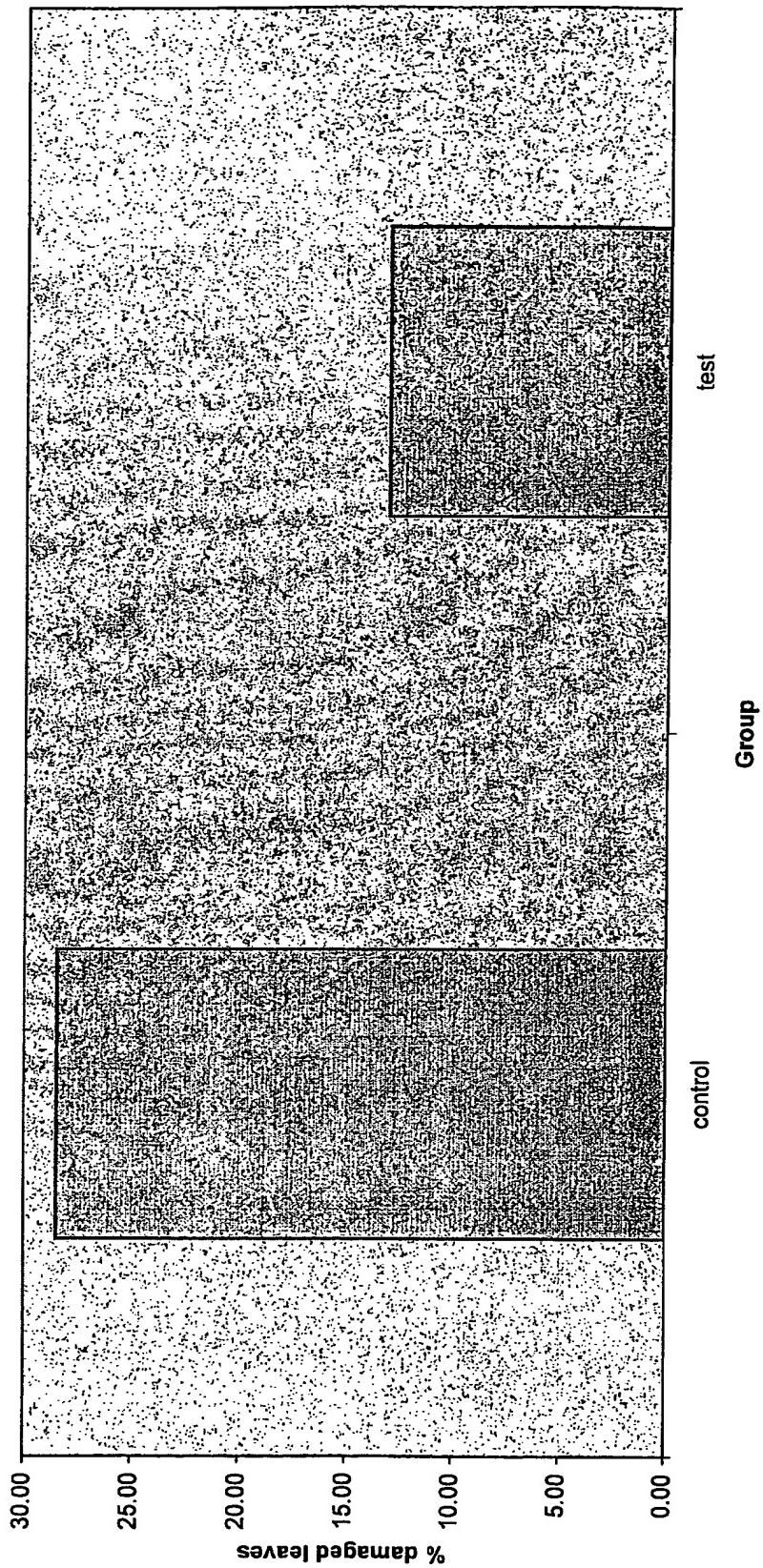


FIG. 21

Major Glasshouse studies to show the effects of *D. reticulatum* slugs after a period of 5 days on pea plants grown (6") in height and applied with beetle formulations of *P. madidus* (methacrylic and tiglic acid) diluted in water (1/100)

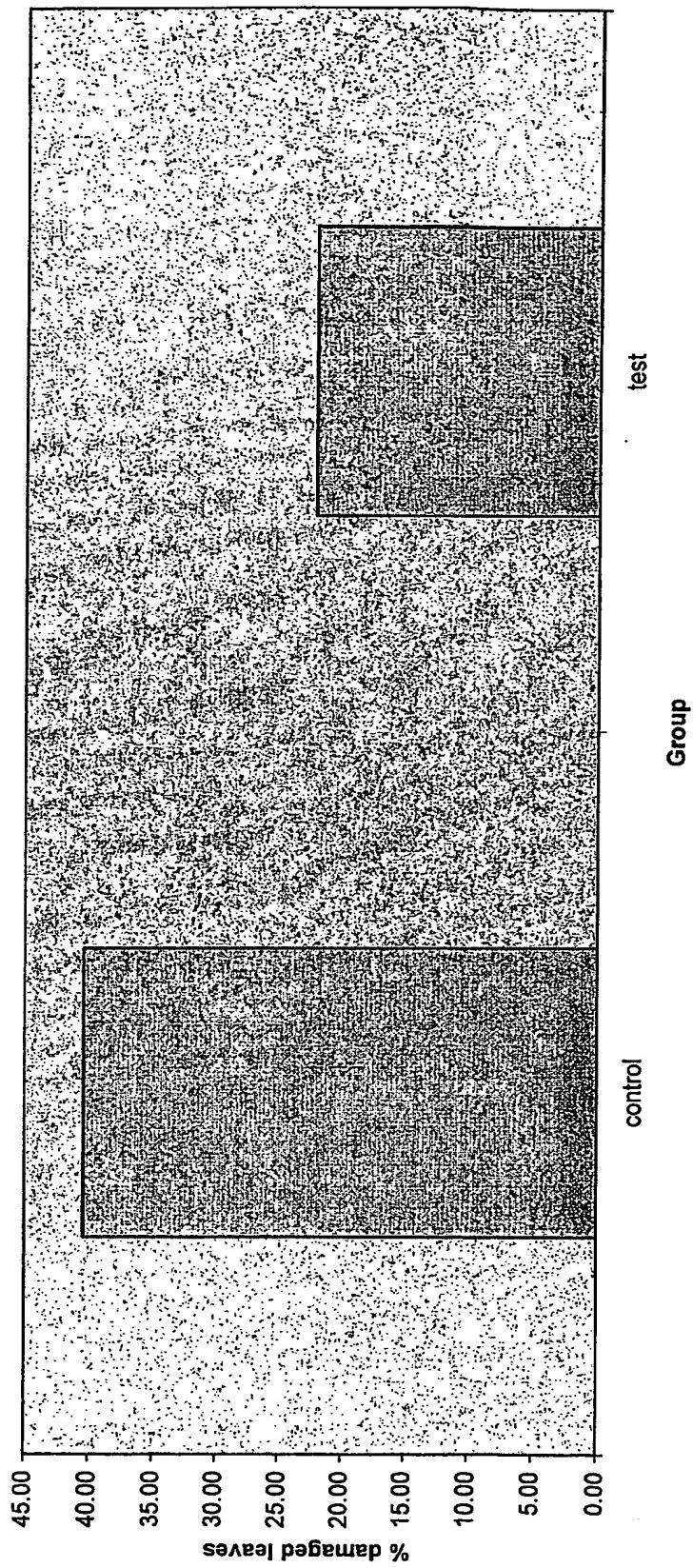
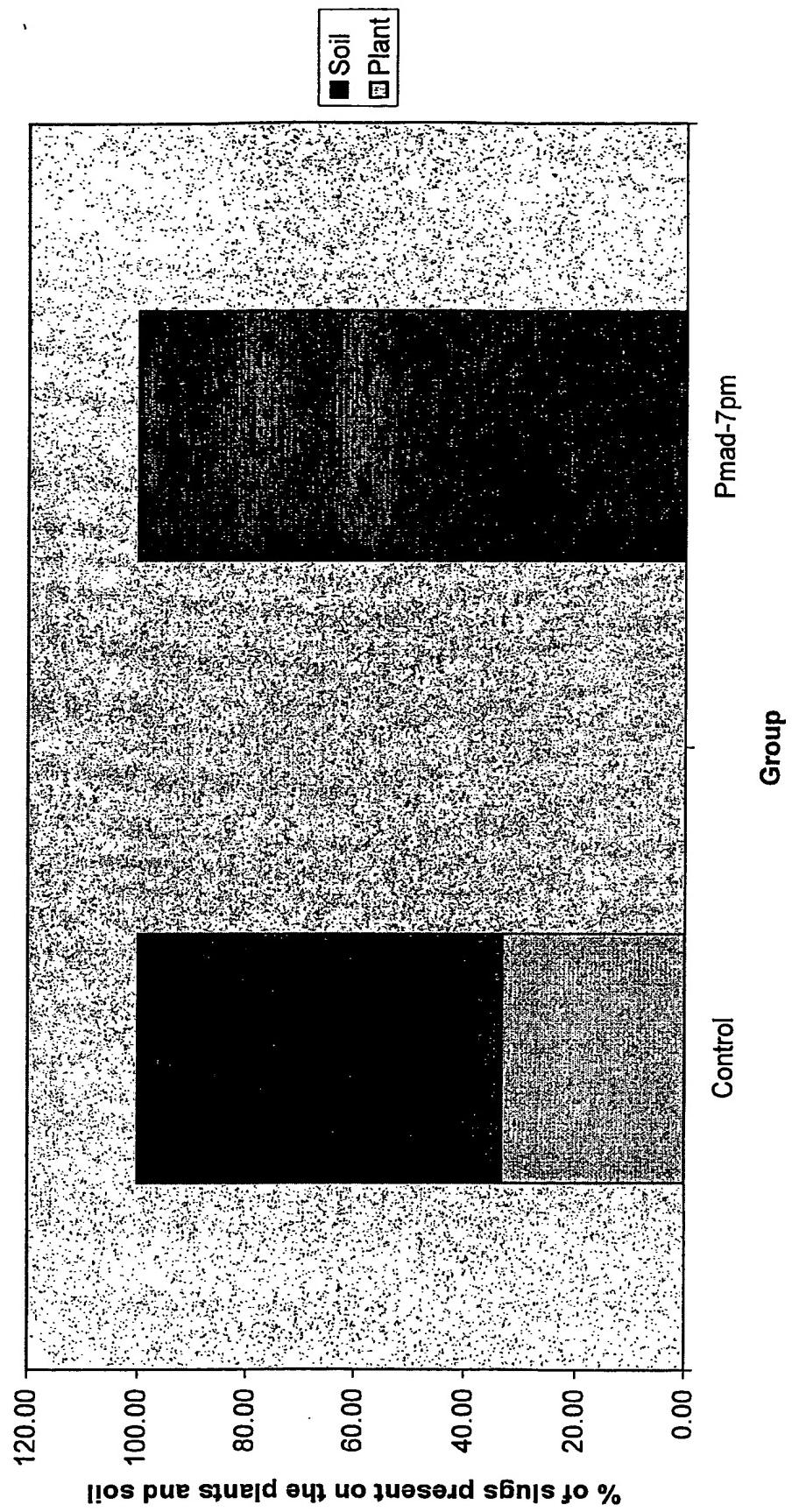


Fig 22

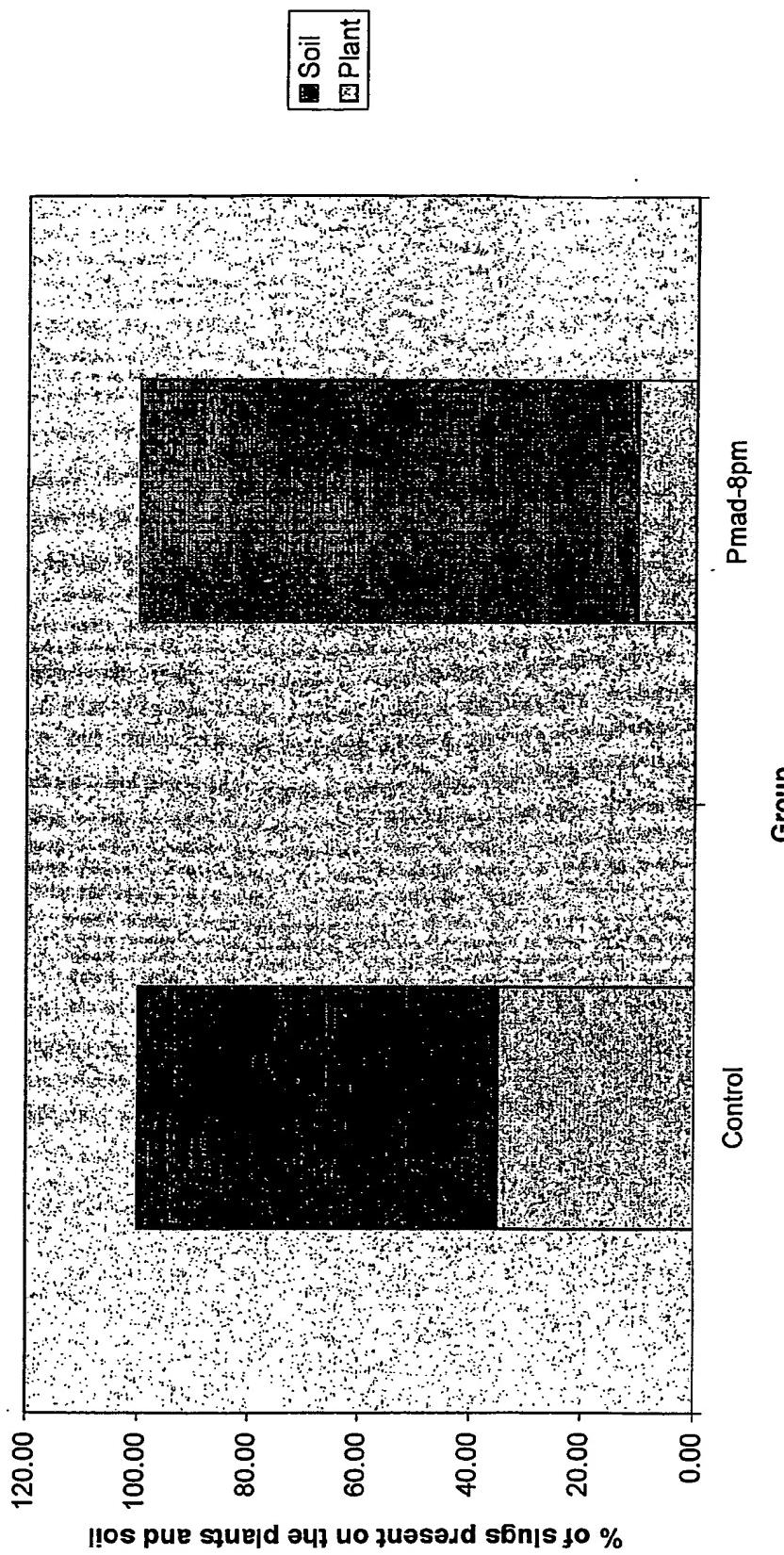
To stop slugs from climbing onto growing pea plants

Glasshouse studies on day 1 to show the effects of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with beetle formulation of *P. madidus*(methacrylic and tiglic acid) chi-sq = 27.931



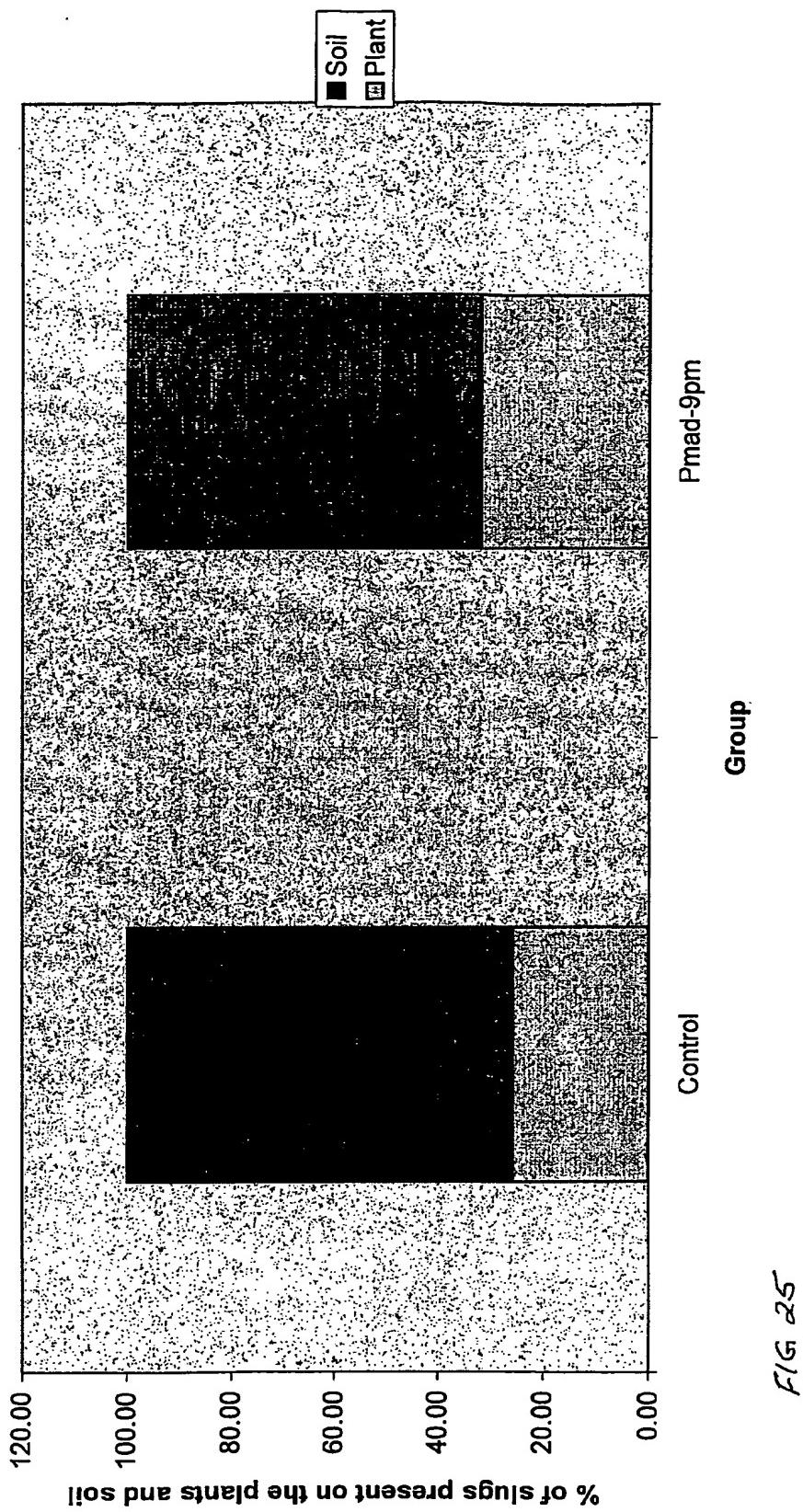
F16, 23

Glasshouse studies on day 1 to show the effects of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with beetle formulation of *P. madidus*(methacrylic and tiglic acid) chi-sq = 10.159

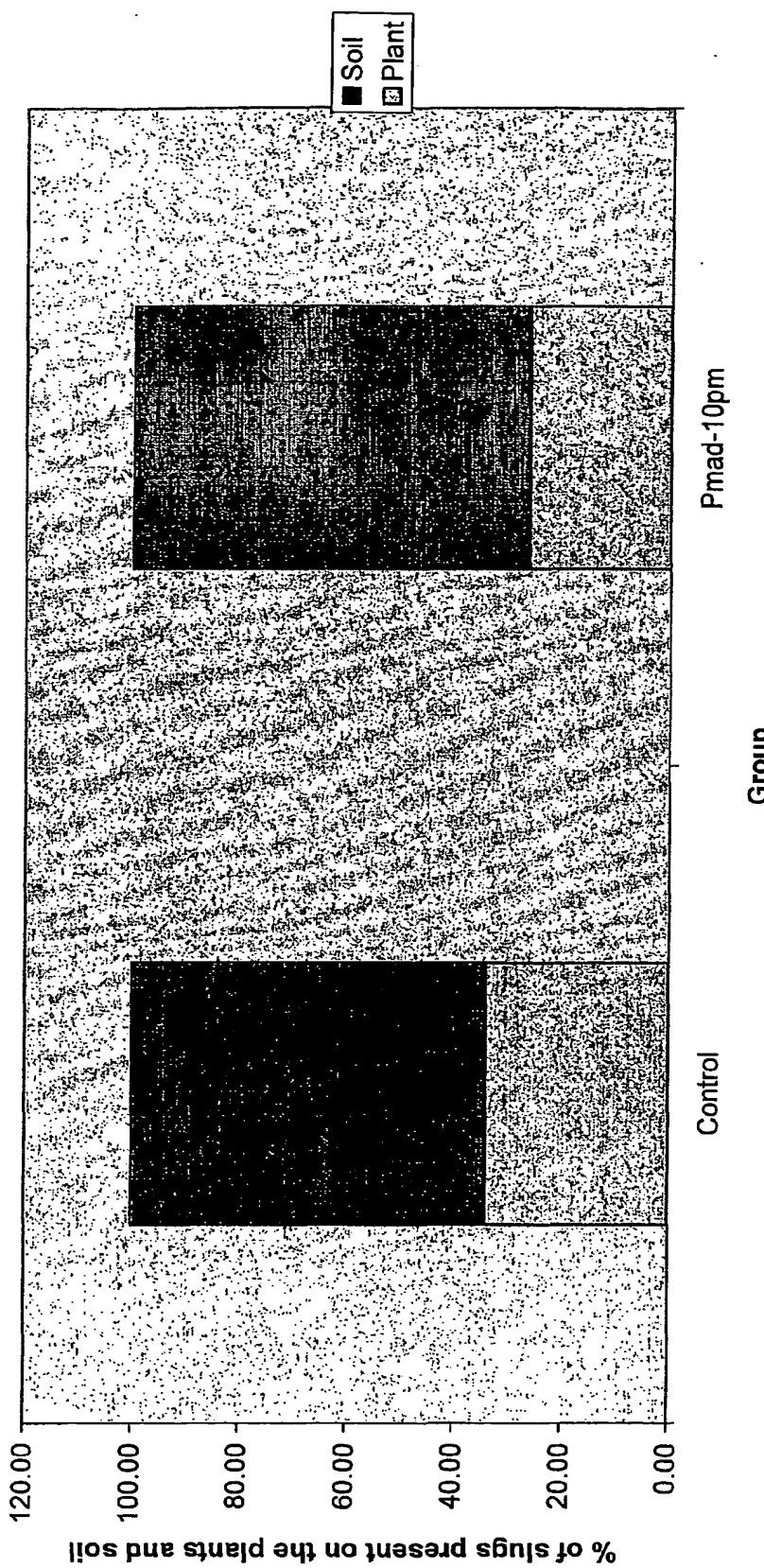


F/G 24

Glasshouse studies on day 1 to show the effects of *D. reticulatum* slugs after a period of 3 hours on pea plants applied with beetle formulation of *P. maddus*(methacrylic and tiglic acid) chi-sq = 0.565



Glasshouse studies on day 1 to show the effects of *D. reticulatum* slugs after a period of 4 hours on pea plants applied with beetle formulation of *P. madidus*(methacrylic and tiglic acid) chi-sq = 0.825



F16 26

Glasshouse studies on day 1 to show the effects of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with methacrylic acid chi-sq = 7.424

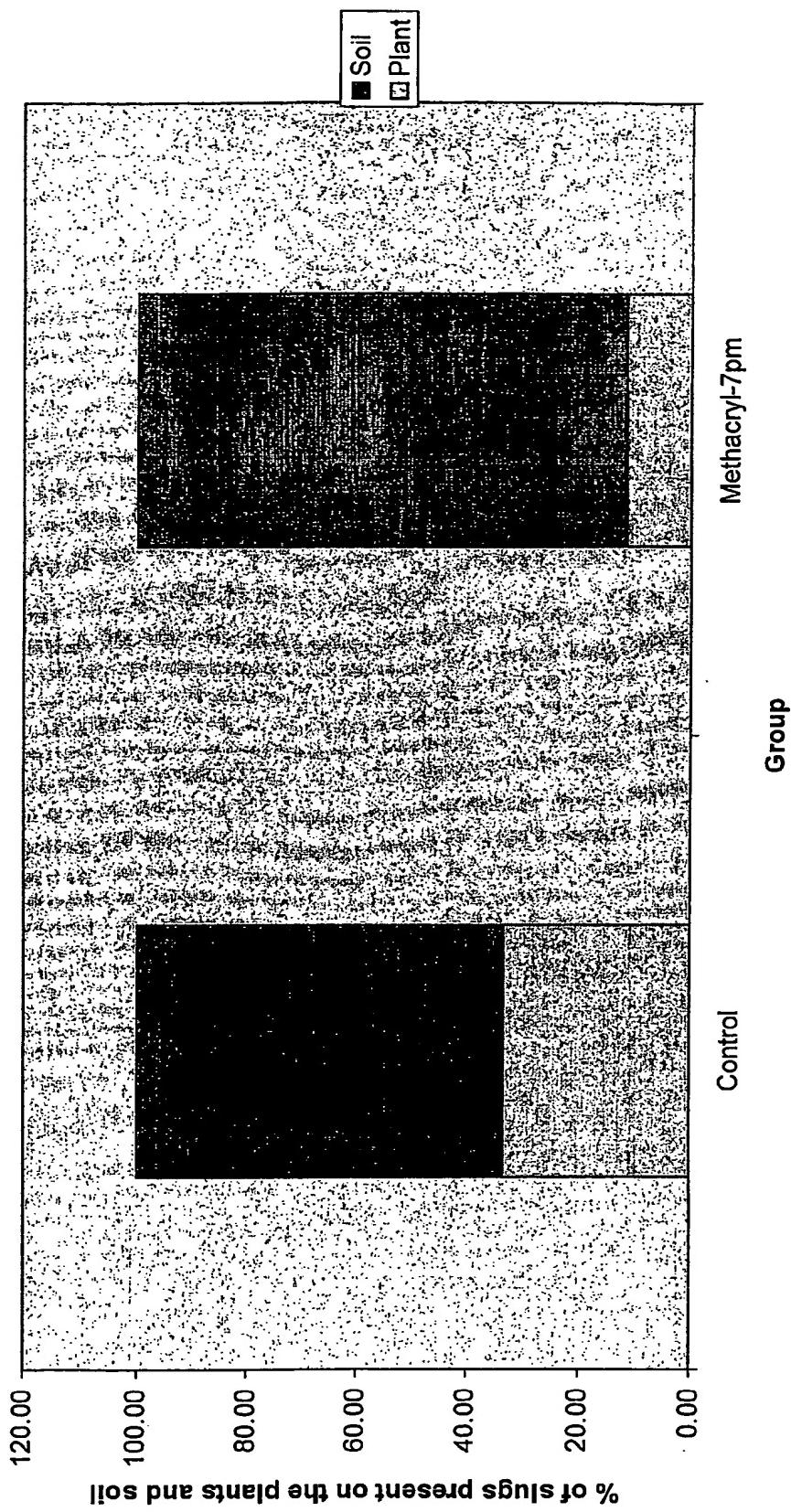


FIG 27

Glasshouse studies on day 1 to show the effects of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with methacrylic acid chi-sq = 1.467

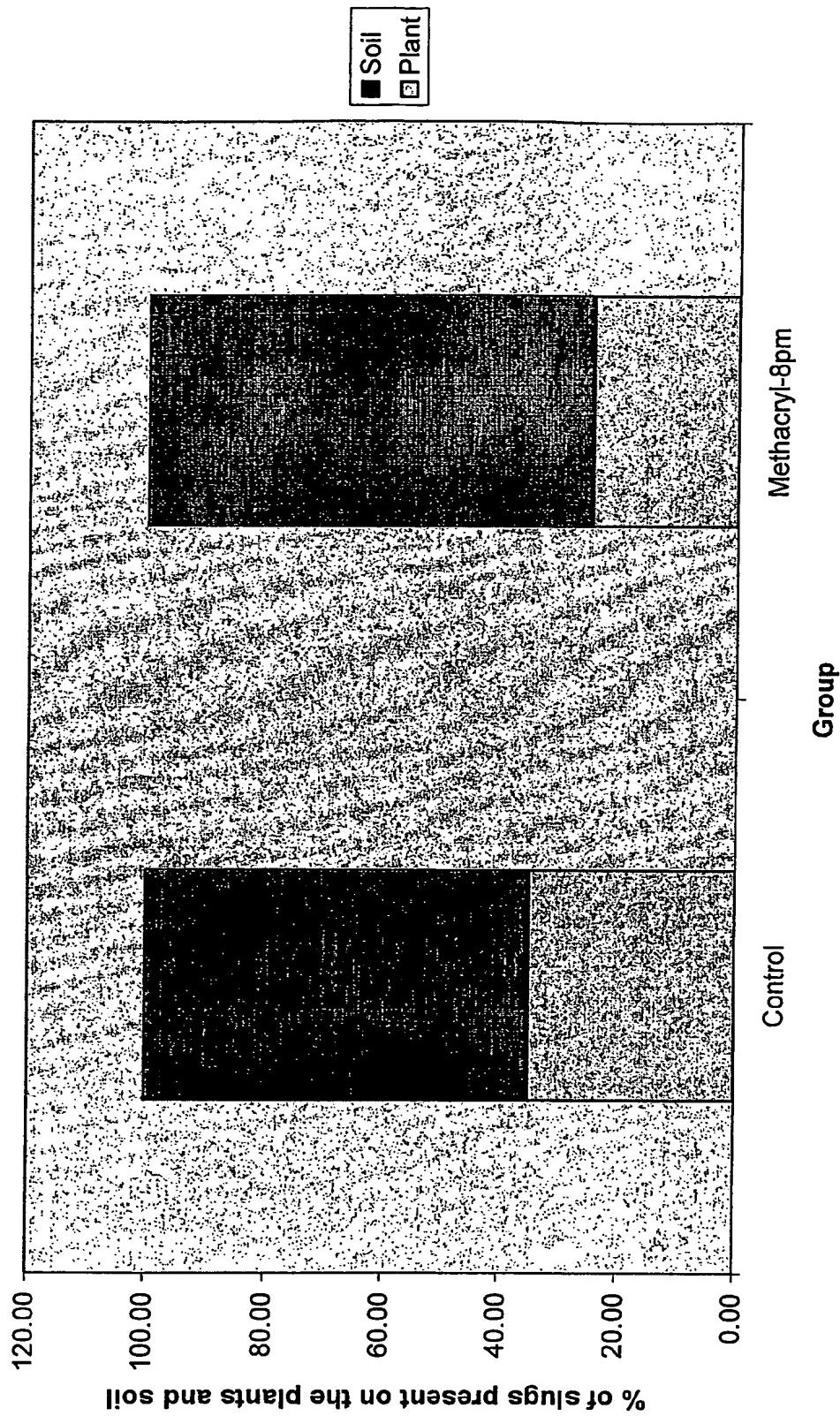


FIG 28

Glasshouse studies on day 1 to show the effects of *D. reticulatum* slugs after a period of 3 hours on pea plants applied with methacrylic acid chi-sq = 2.328

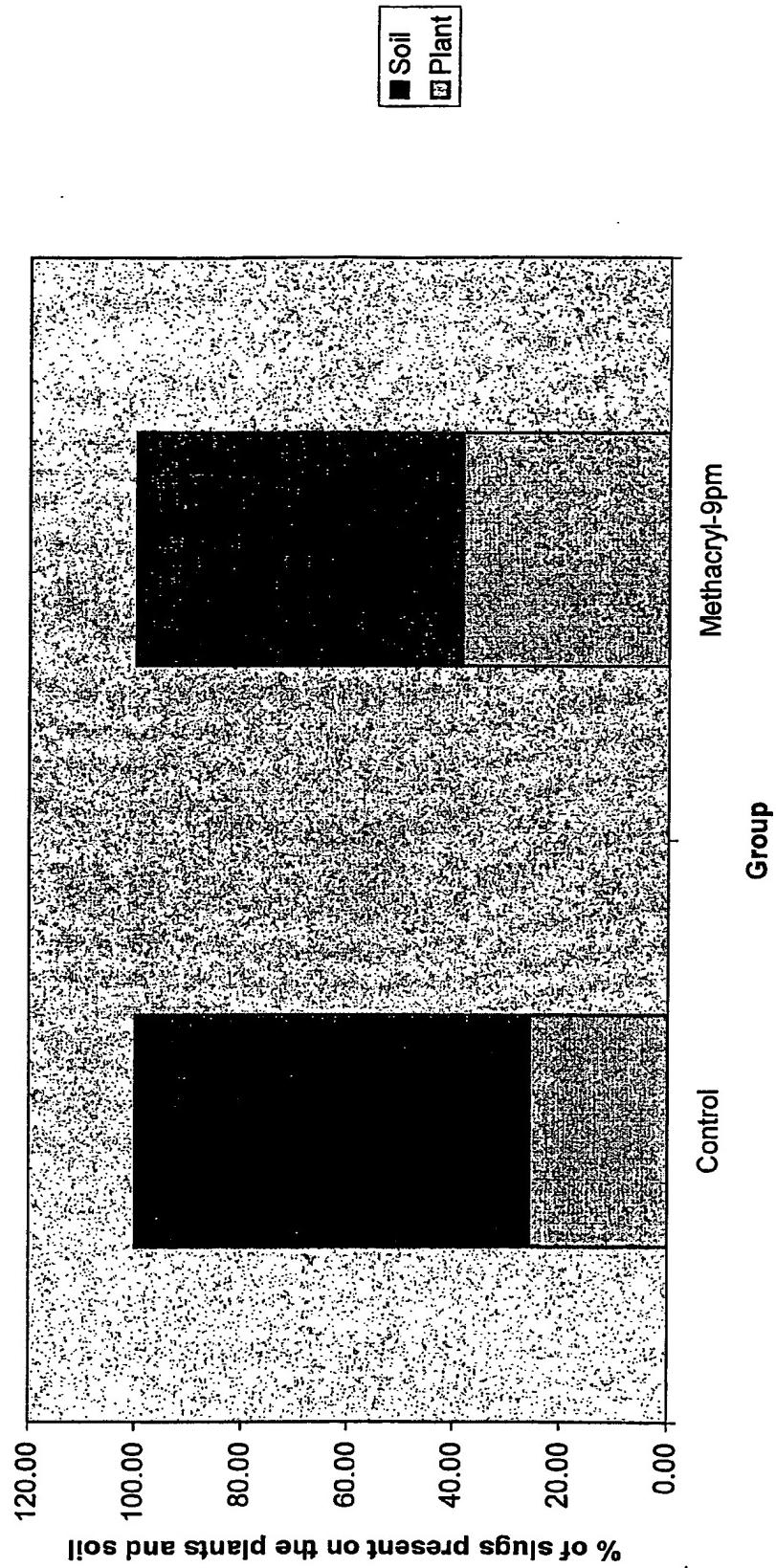


FIG 29

Glasshouse studies on day 1 to show the effects of *D. reticulatum* slugs after a period of 4 hours on pea plants applied with methacrylic acid $\chi_i \cdot \text{sq} = 0.059$

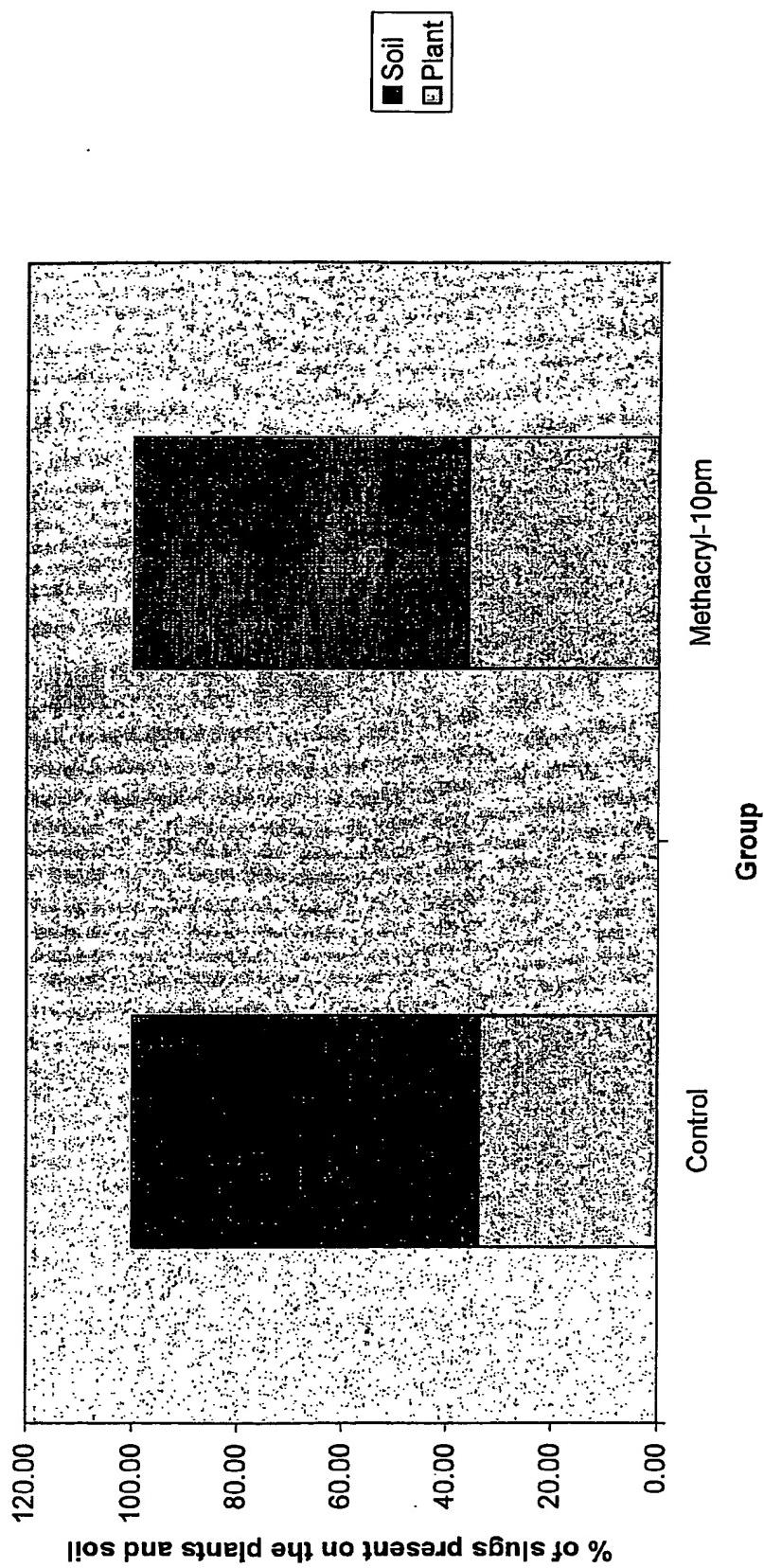


Fig. 30

Glasshouse studies on day 2 to show the effects of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with beetle formulation of *P.madidus*(mehtacrylic and tiglic acid) chi-sq = 16.259

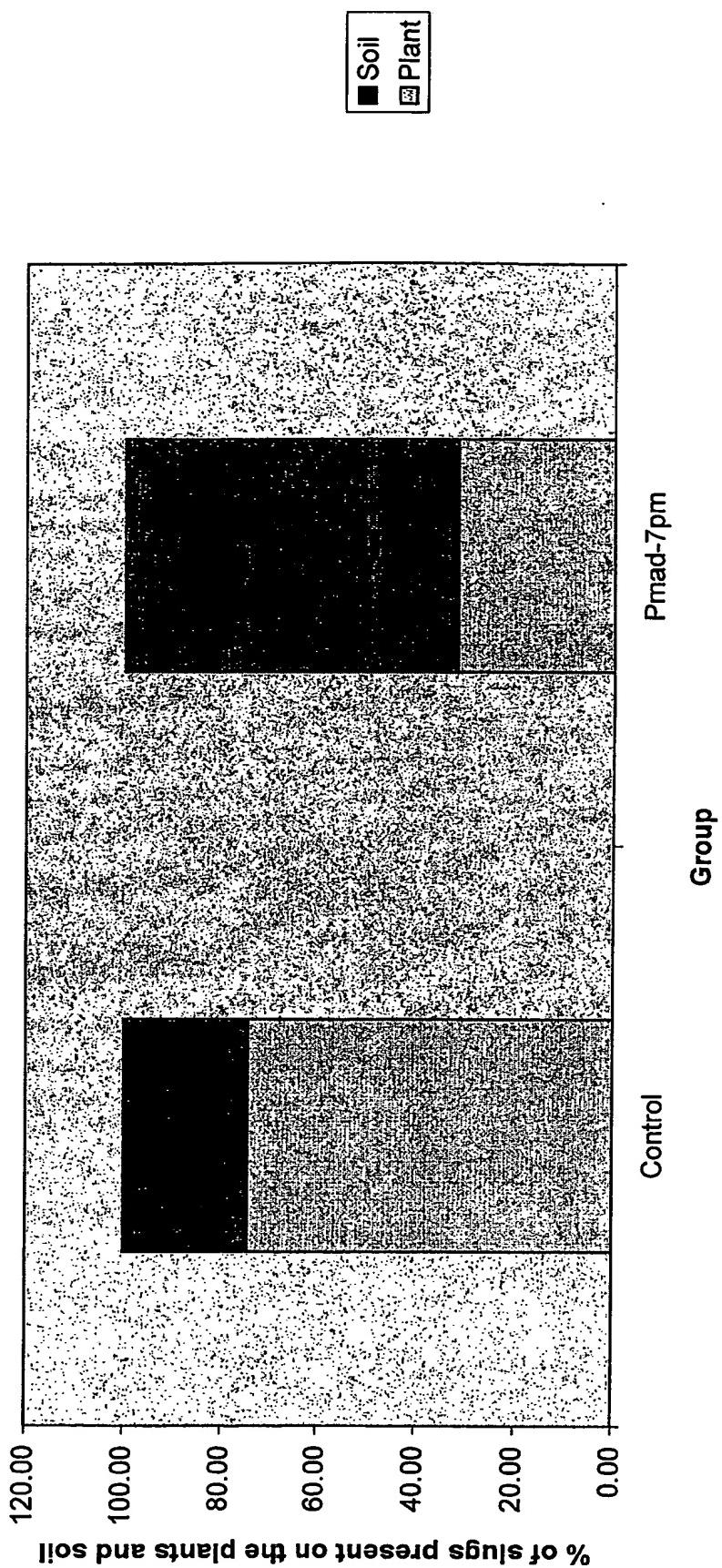
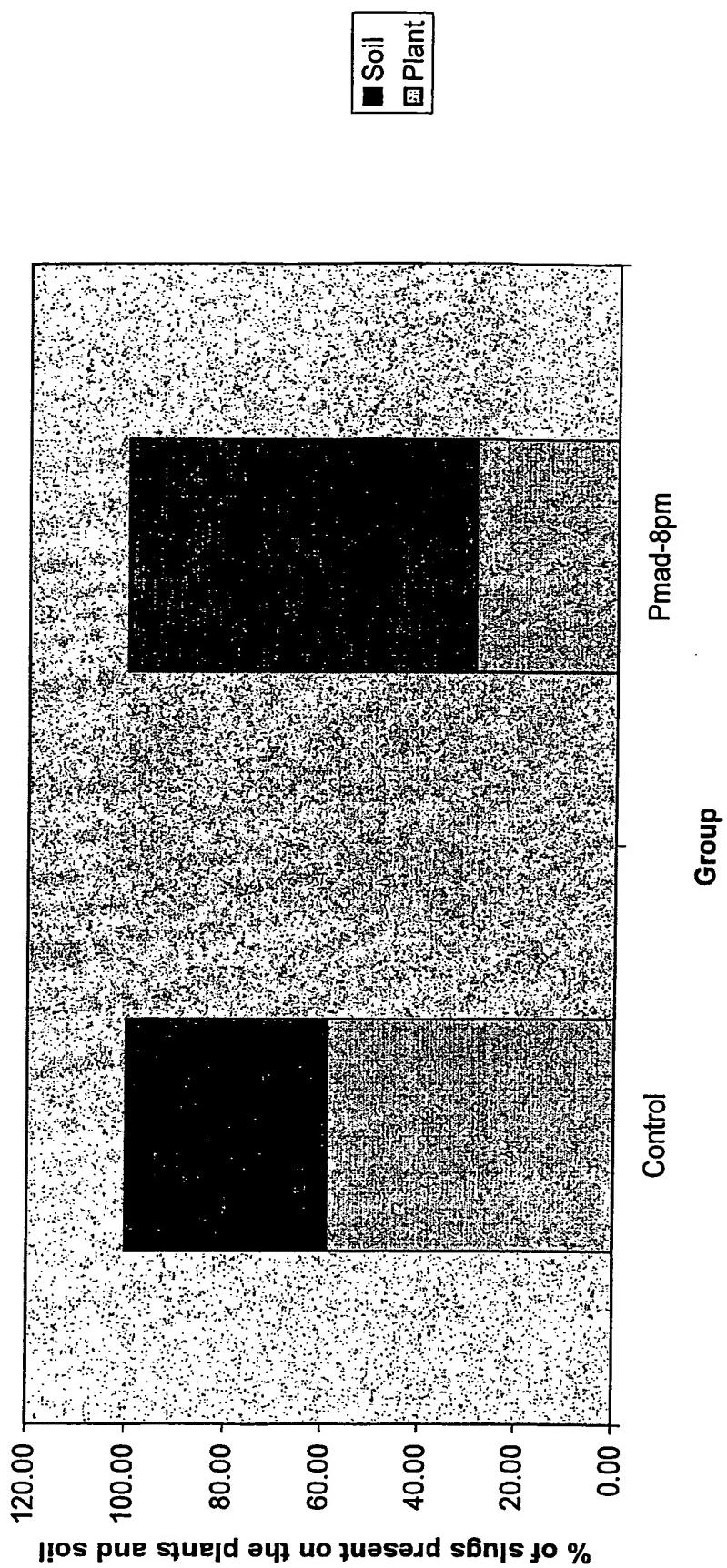


FIG 31

Glasshouse studies on day 2 to show the effects of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with beetle formulation of *P. madidus*(methacrylic and tiglic acid) chi-sq = 7.722



Glasshouse studies on day 2 to show the effects of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with methacrylic acid chi-sq = 13.450

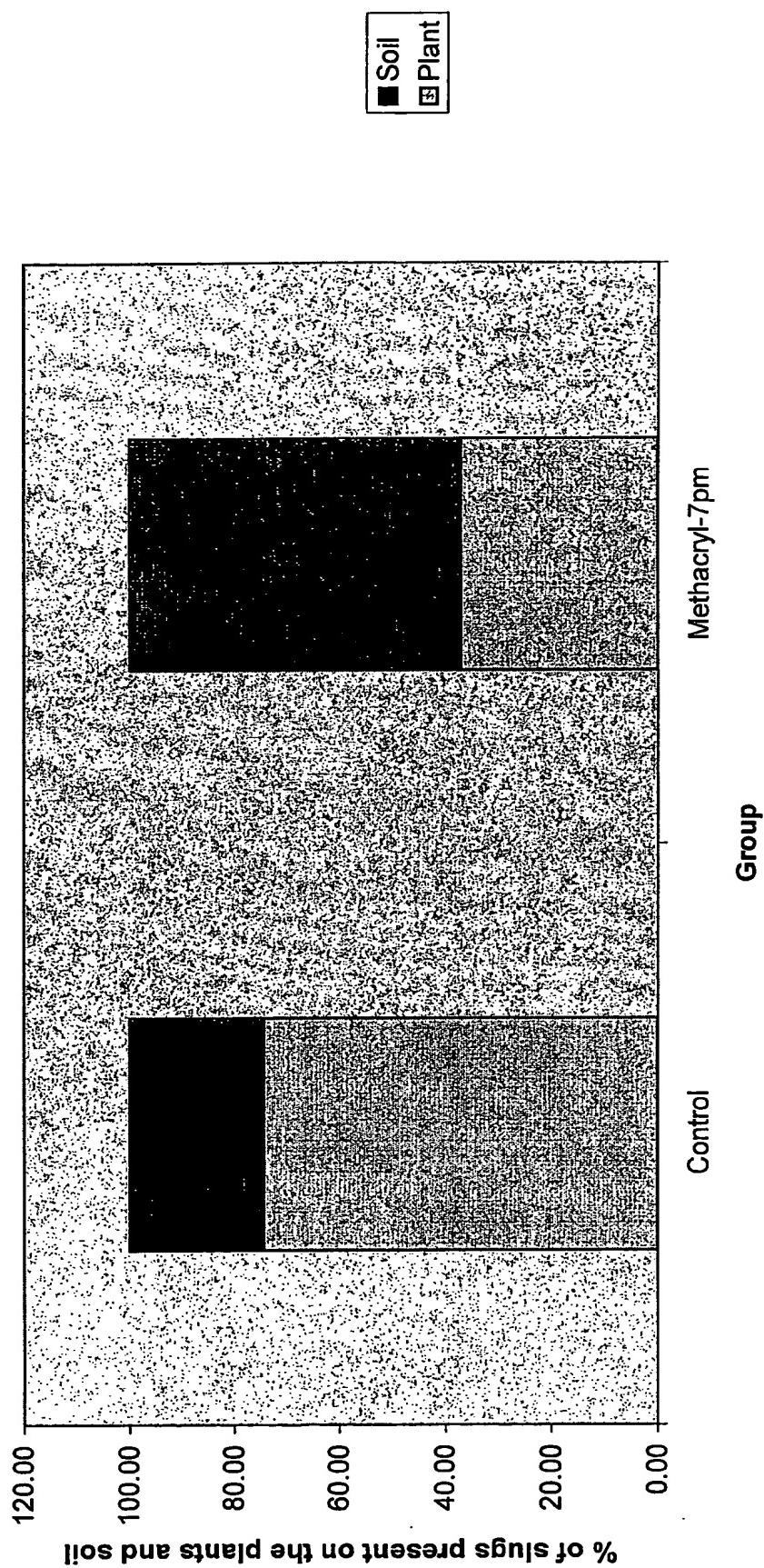


FIG 33

Glasshouse studies on day 2 to show the effects of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with methacrylic acid chi-sq = 2.579

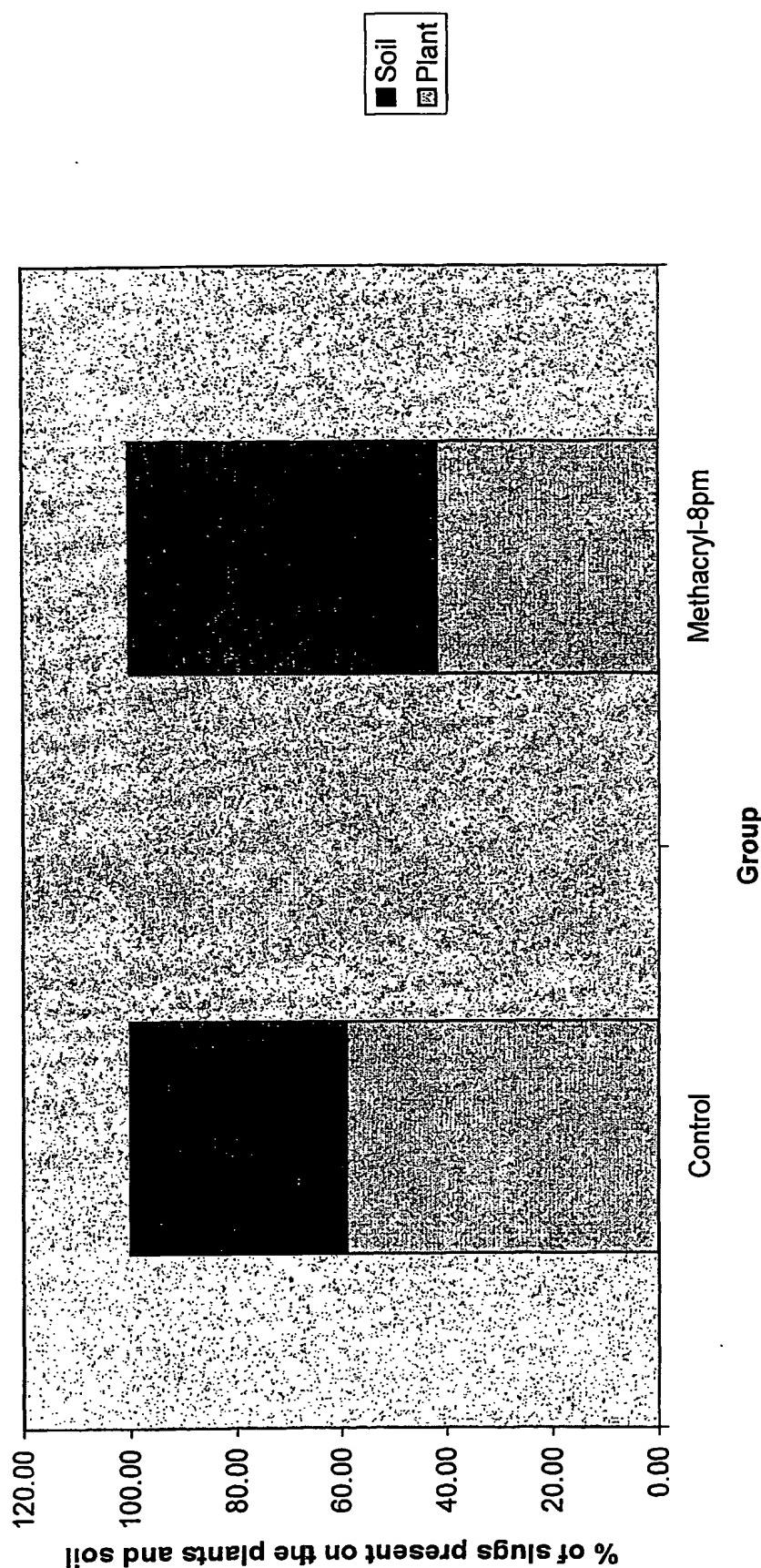
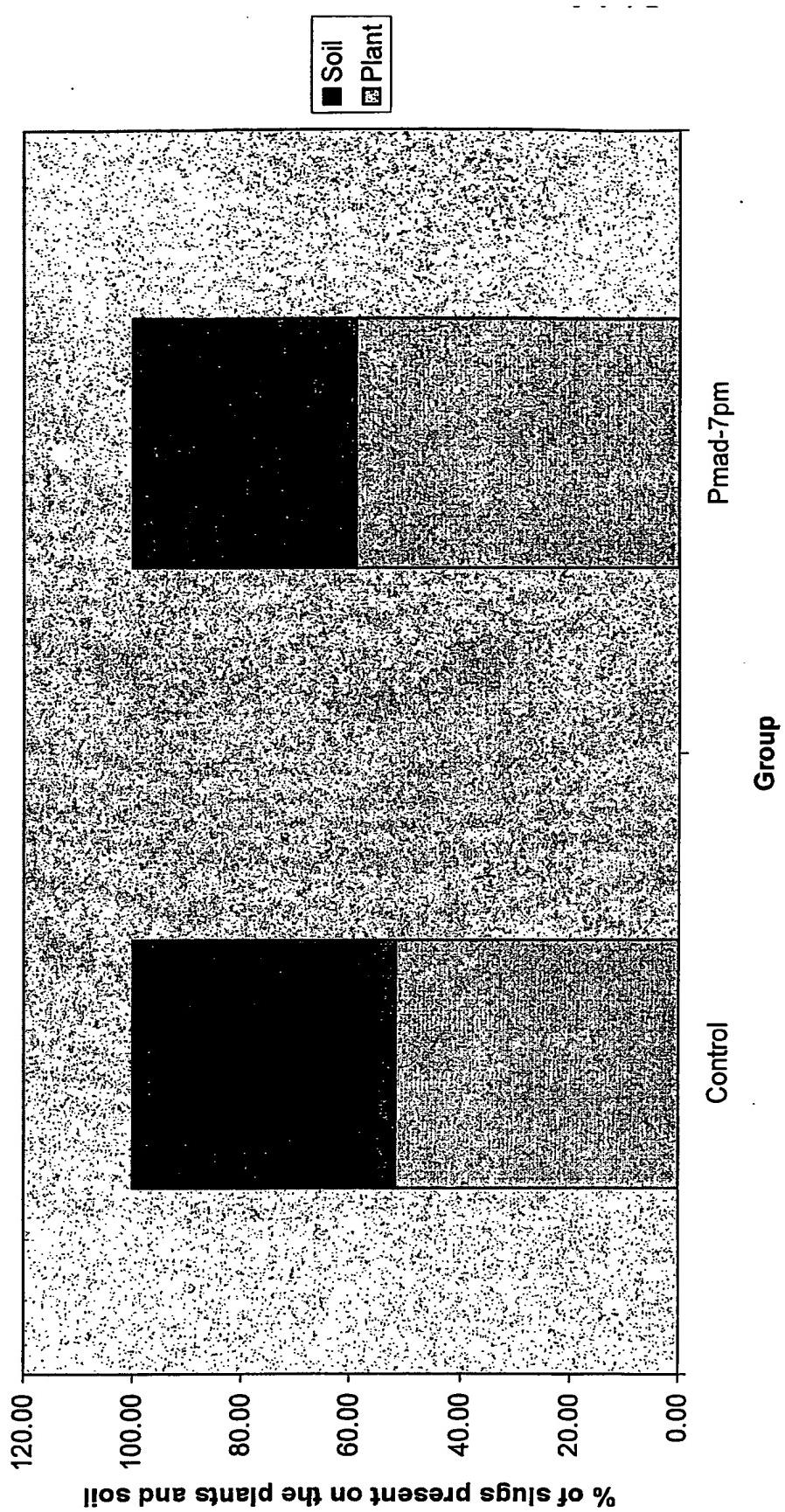


FIG 34

Glasshouse studies on day 5 to show the effects of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with beetle formulation of *P.madidus*(methacrylic and tiglic acid) chi-sq = 0.355



Glasshouse studies on day 5 to show the effects of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with beetle formulation of *P. madidus*(methacrylic and tiglic acid) chi-sq = 0.003

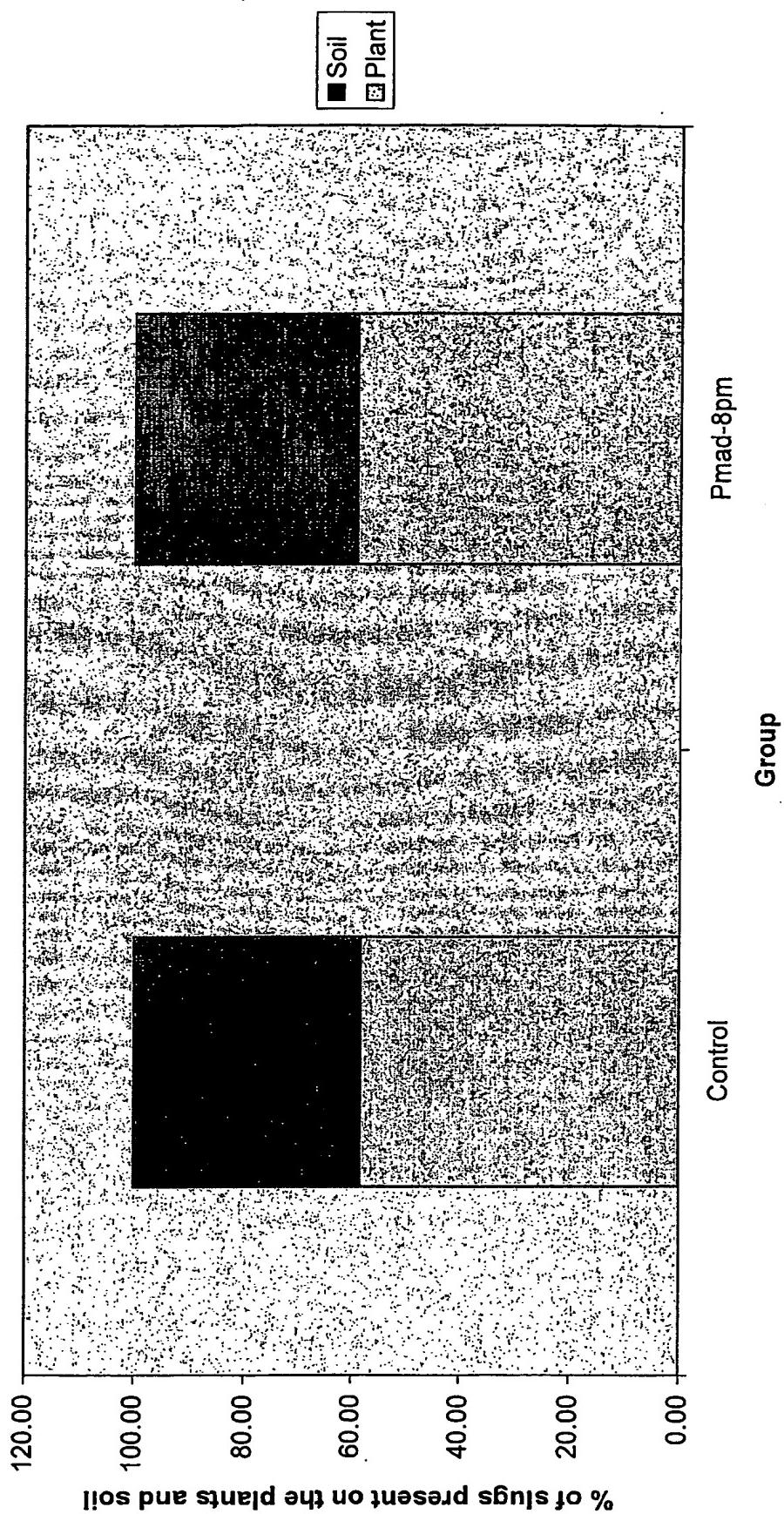


FIG 36

Glasshouse studies on day 5 to show the effects of *D. reticulatum* slugs after a period of 3 hours on pea plants applied with beetle formulation of *P. madidus*(methacrylic and tiglic acid) chi-sq = 0.483

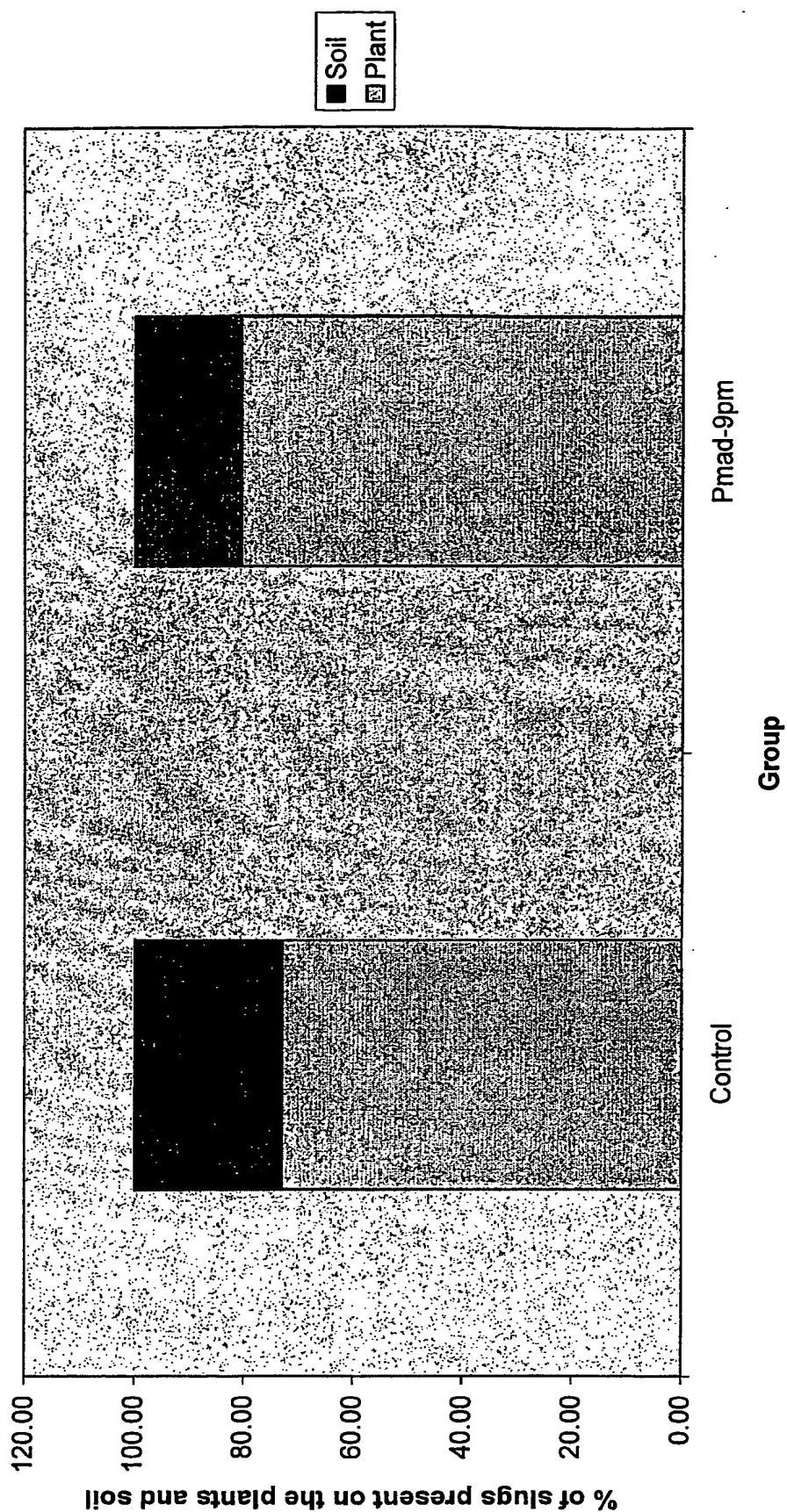
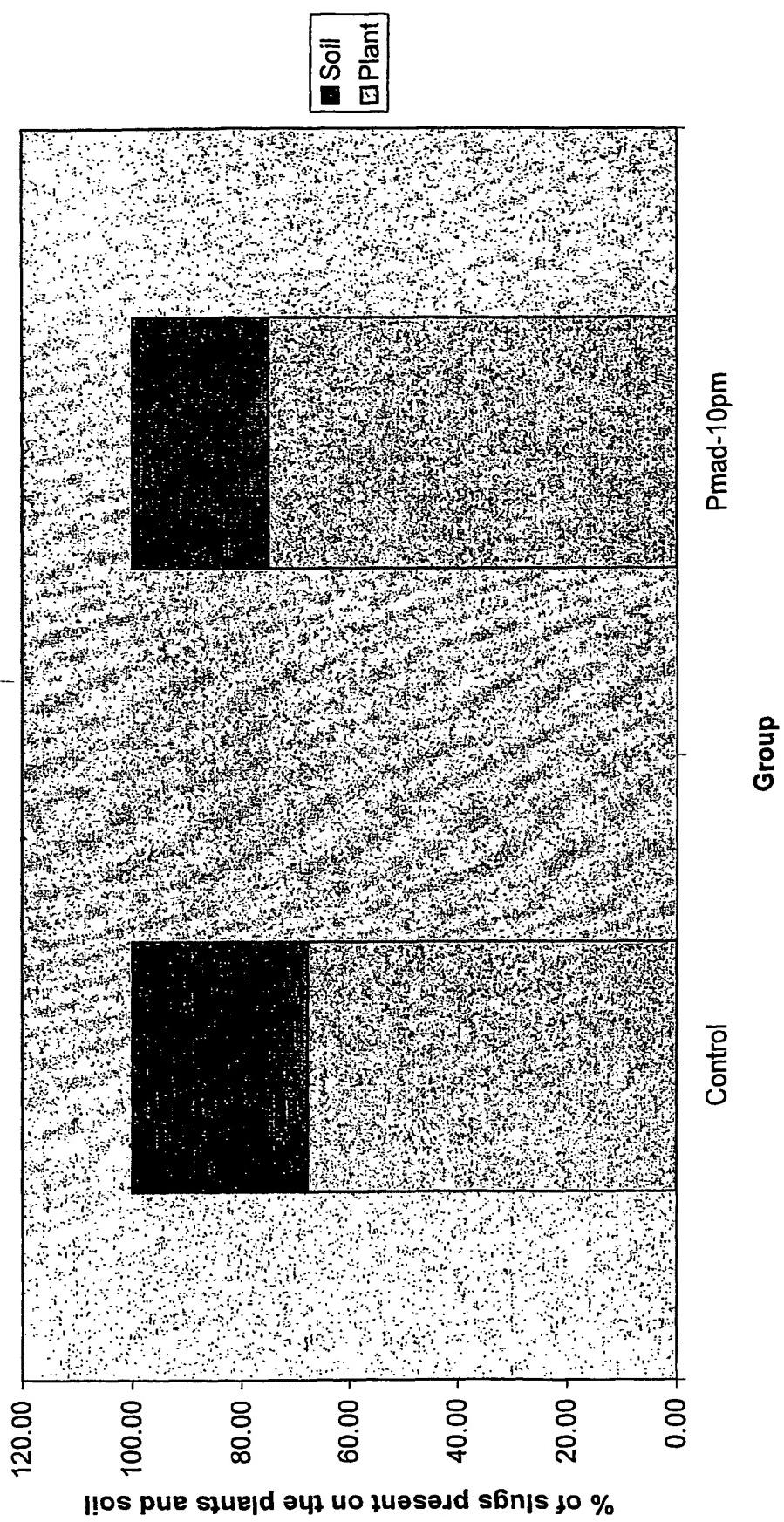


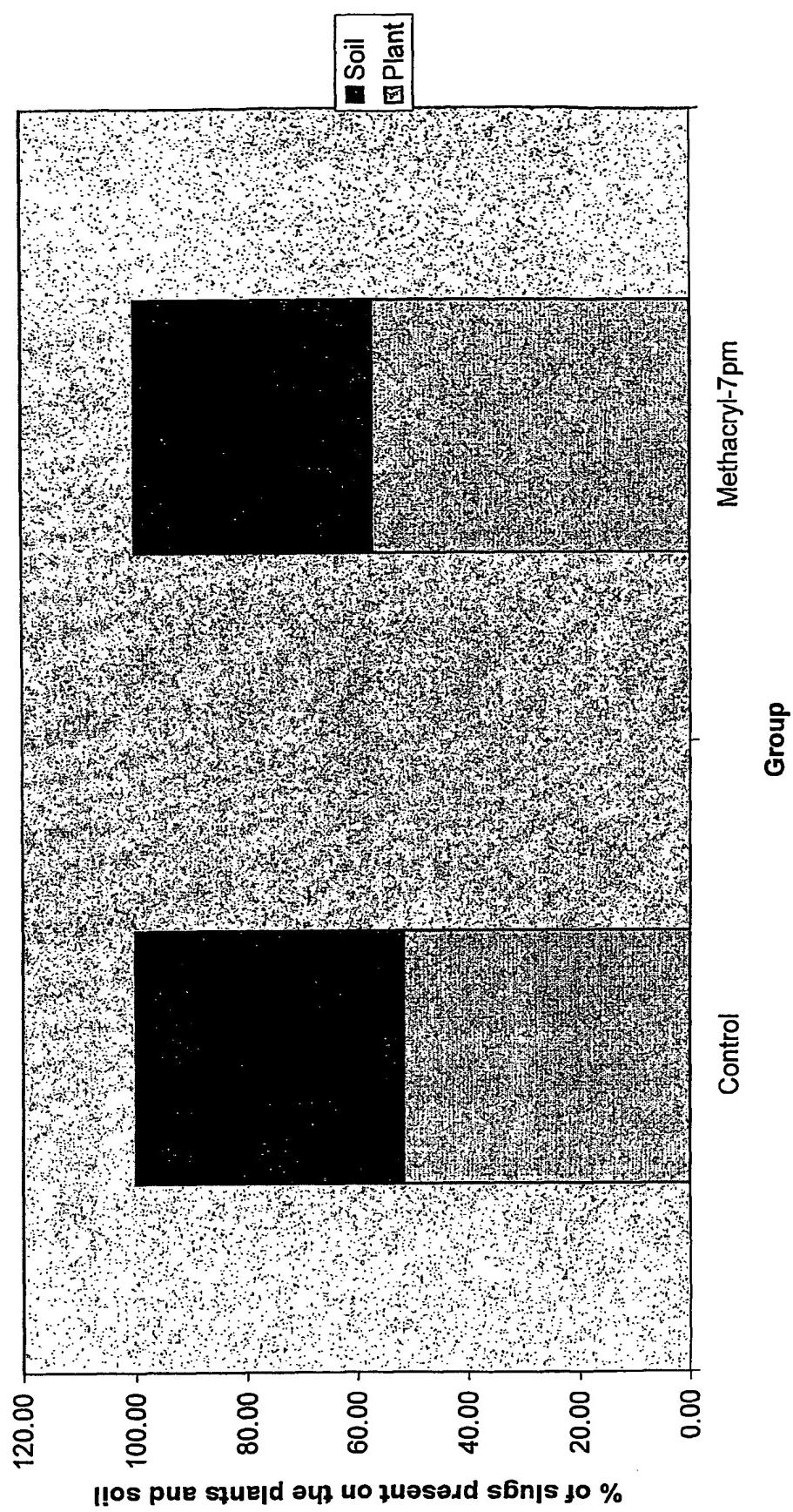
FIG. 37

Glasshouse studies on day 5 to show the effects of *D. reticulatum* slugs after a period of 4 hours on pea plants applied with beetle formulation of *P. madidus*(methacrylic and tiglic acid) chi-sq = 0.455

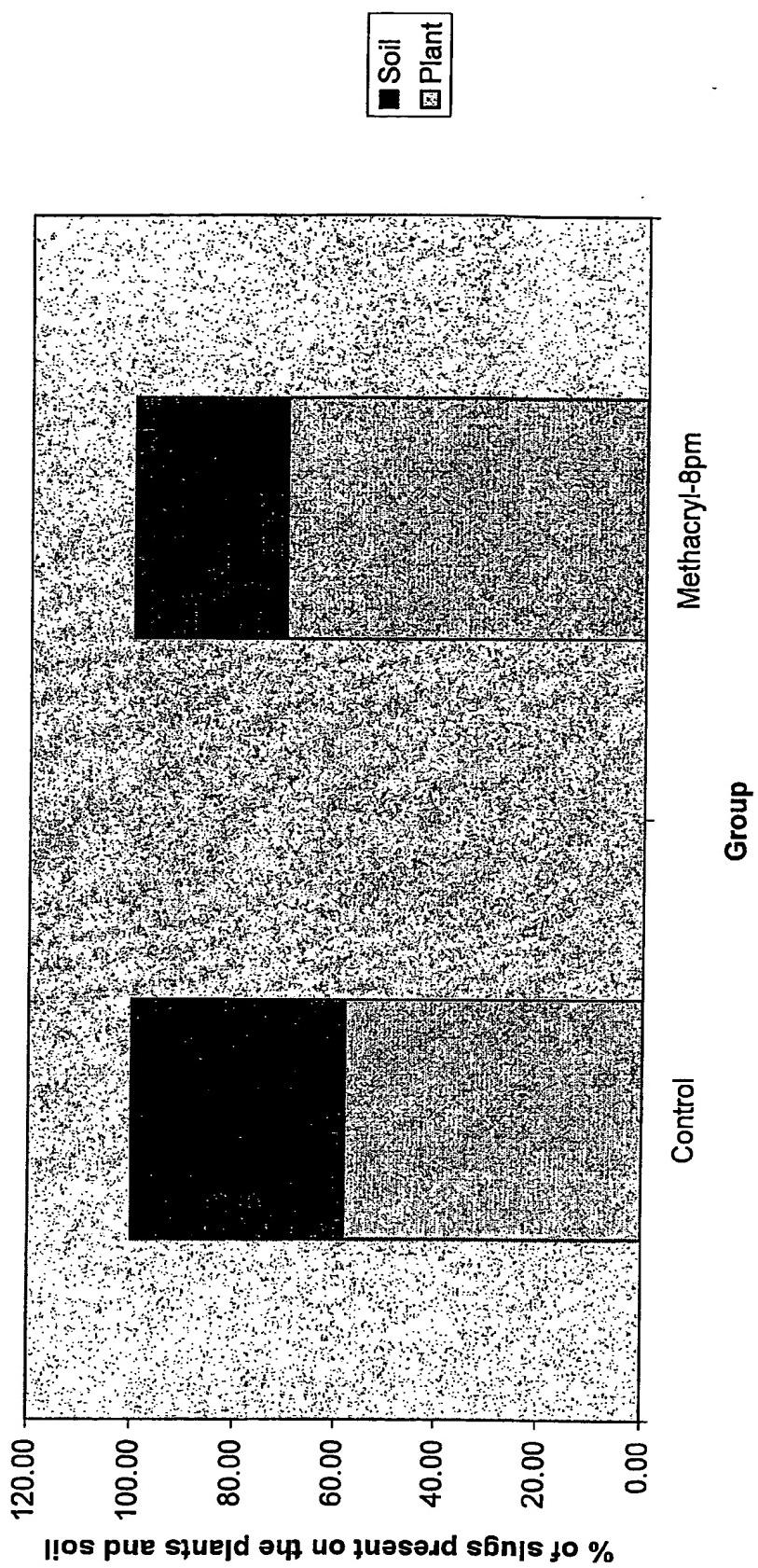


K/6 38

Glasshouse studies on day 5 to show the effects of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with methacrylic acid $\chi^2_{sq} = 0.169$

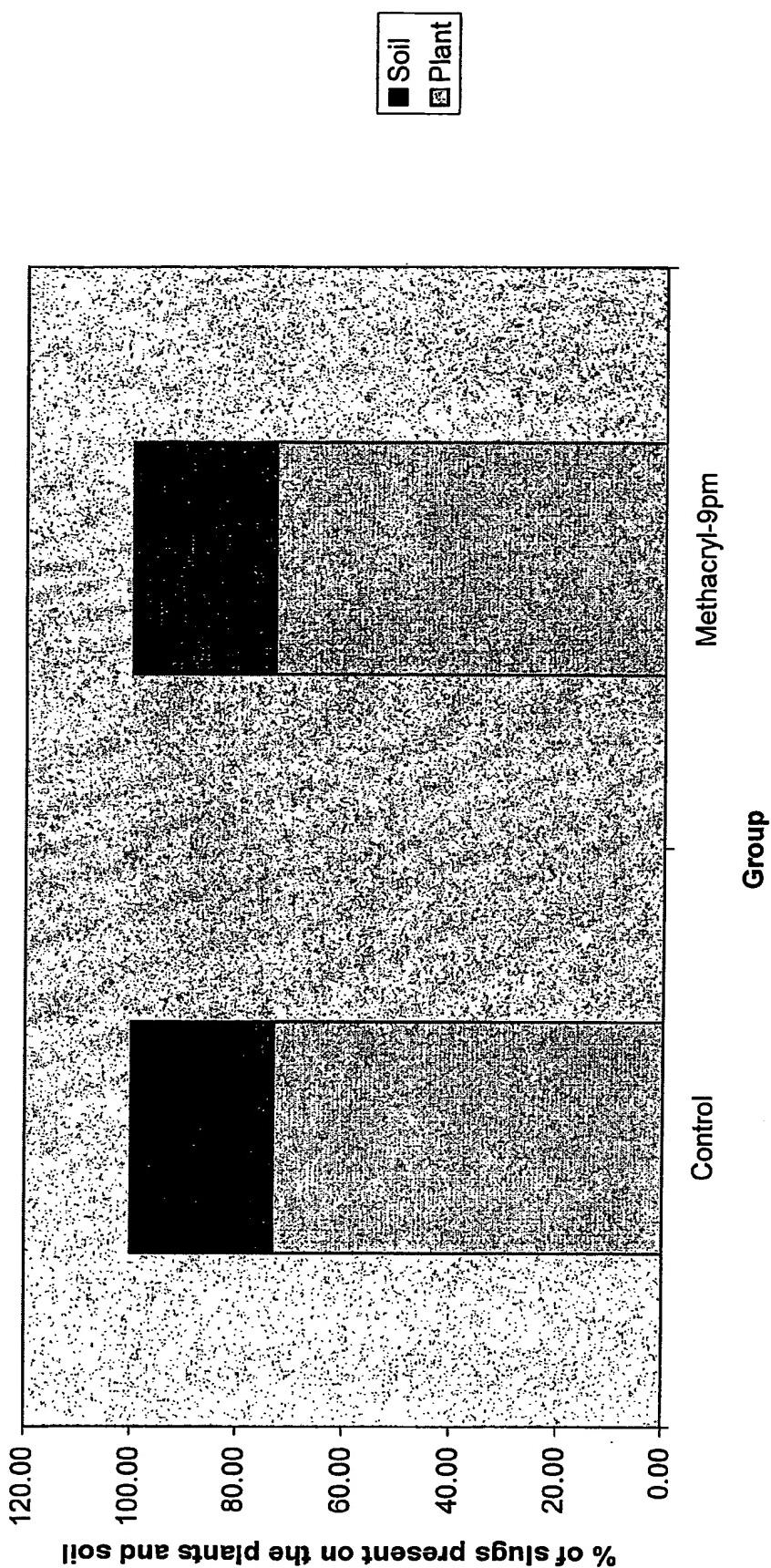


Glasshouse studies on day 5 to show the effects of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with methacrylic acid chi-sq = 0.806

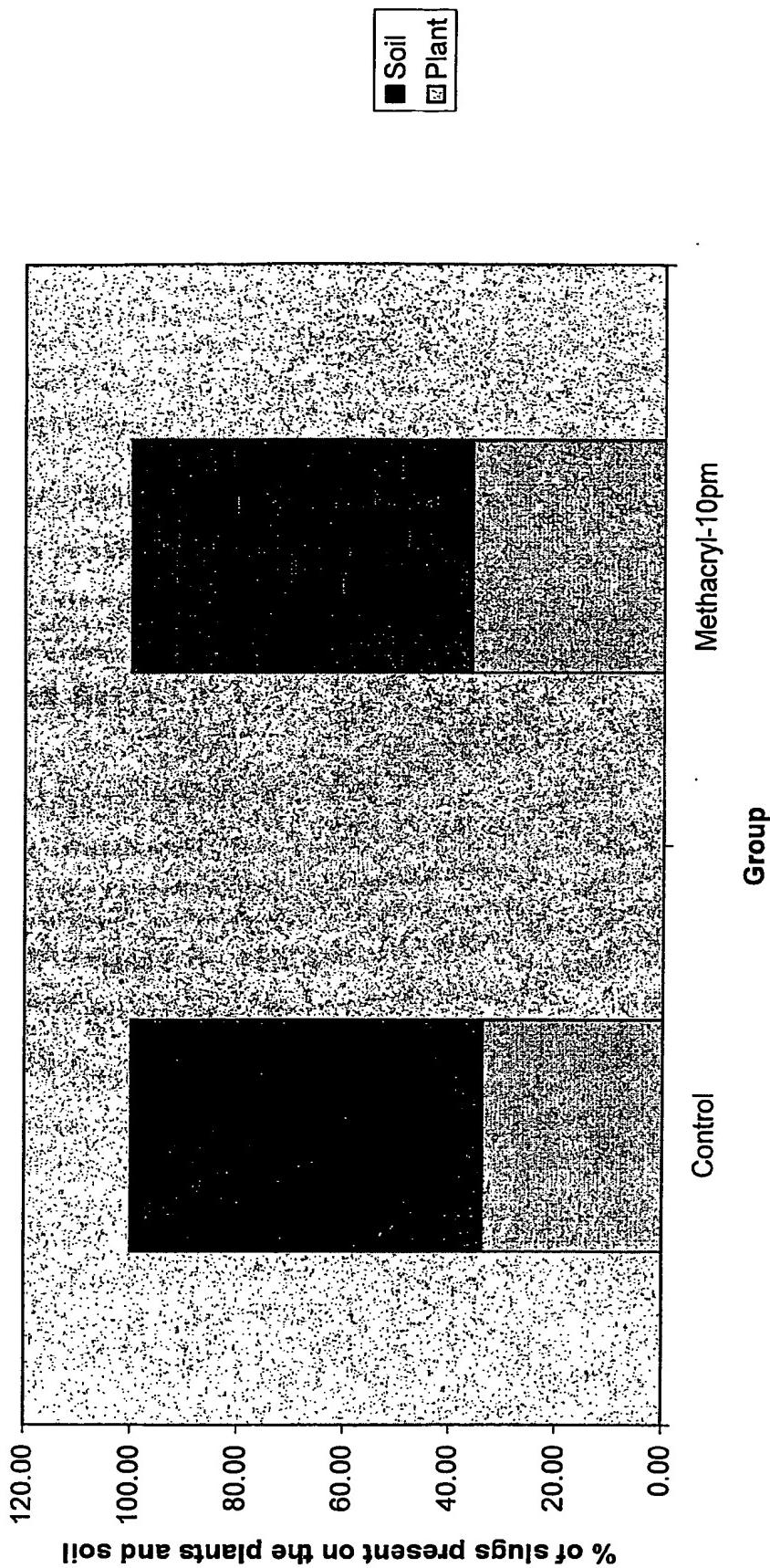


F1G 40

Glasshouse studies on day 5 to show the effects of *D. reticulatum* slugs after a period of 3 hours on pea plants applied with methacrylic acid chi-sq = 0.000



Glasshouse studies on day 5 to show the effects of *D. reticulatum* slugs after a period of 4 hours on pea plants applied with methacrylic acid chi-sq = 0.131



**And eventually to prevent slugs from ~~migrating~~ into the
pea plants**

Glasshouse studies on day 1 to show the position of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with beetle formulation of *P. maidis*(methacrylic and tiglic acid)

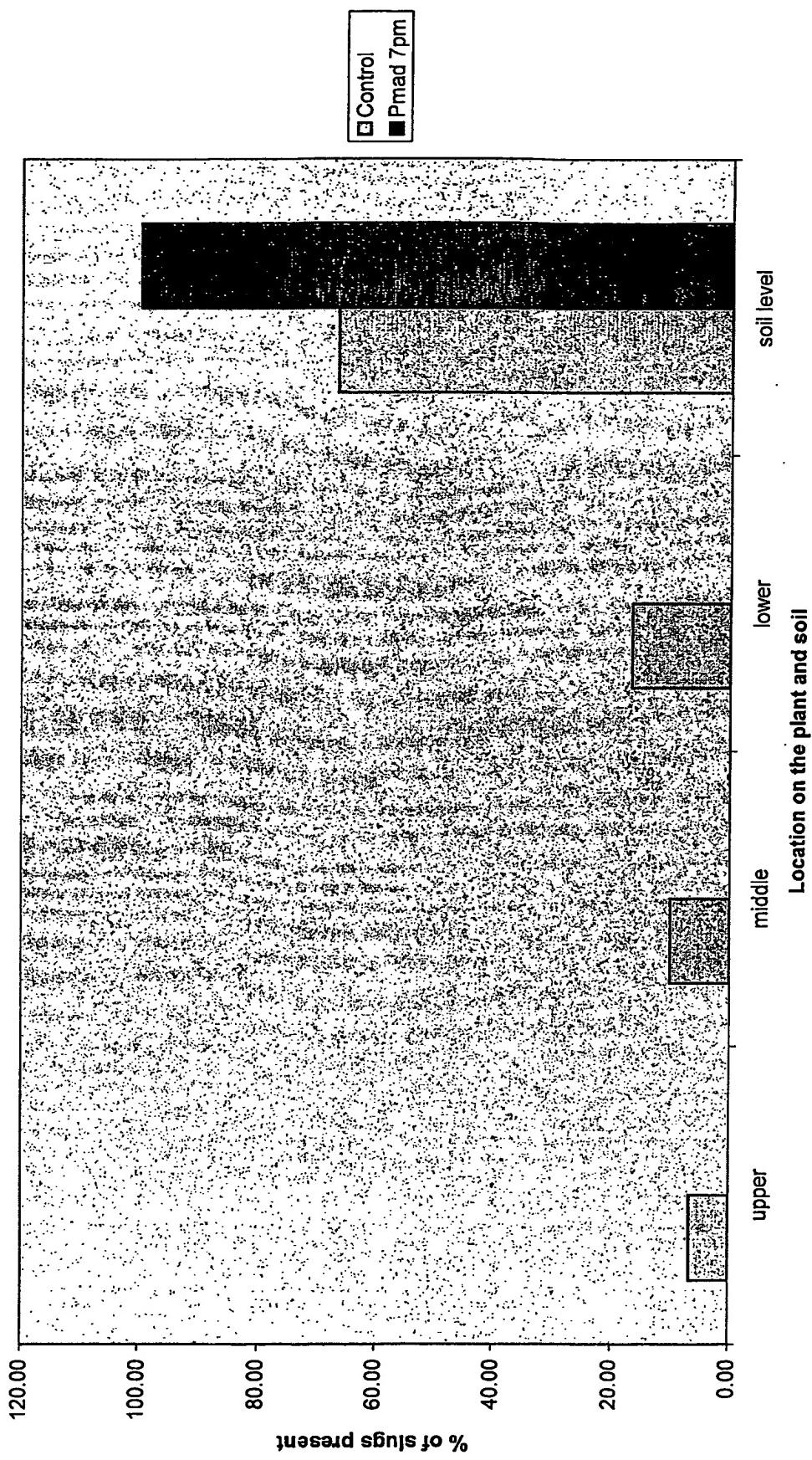
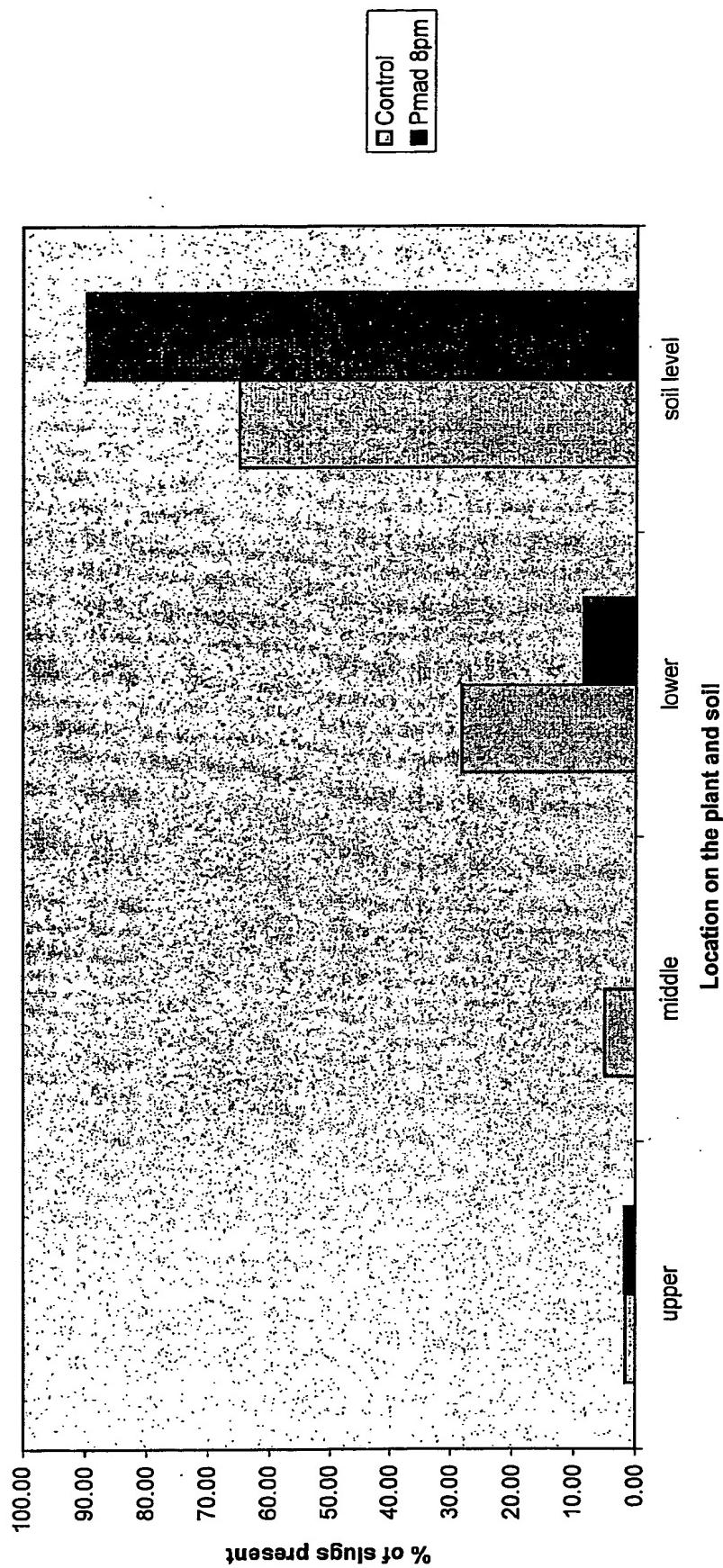


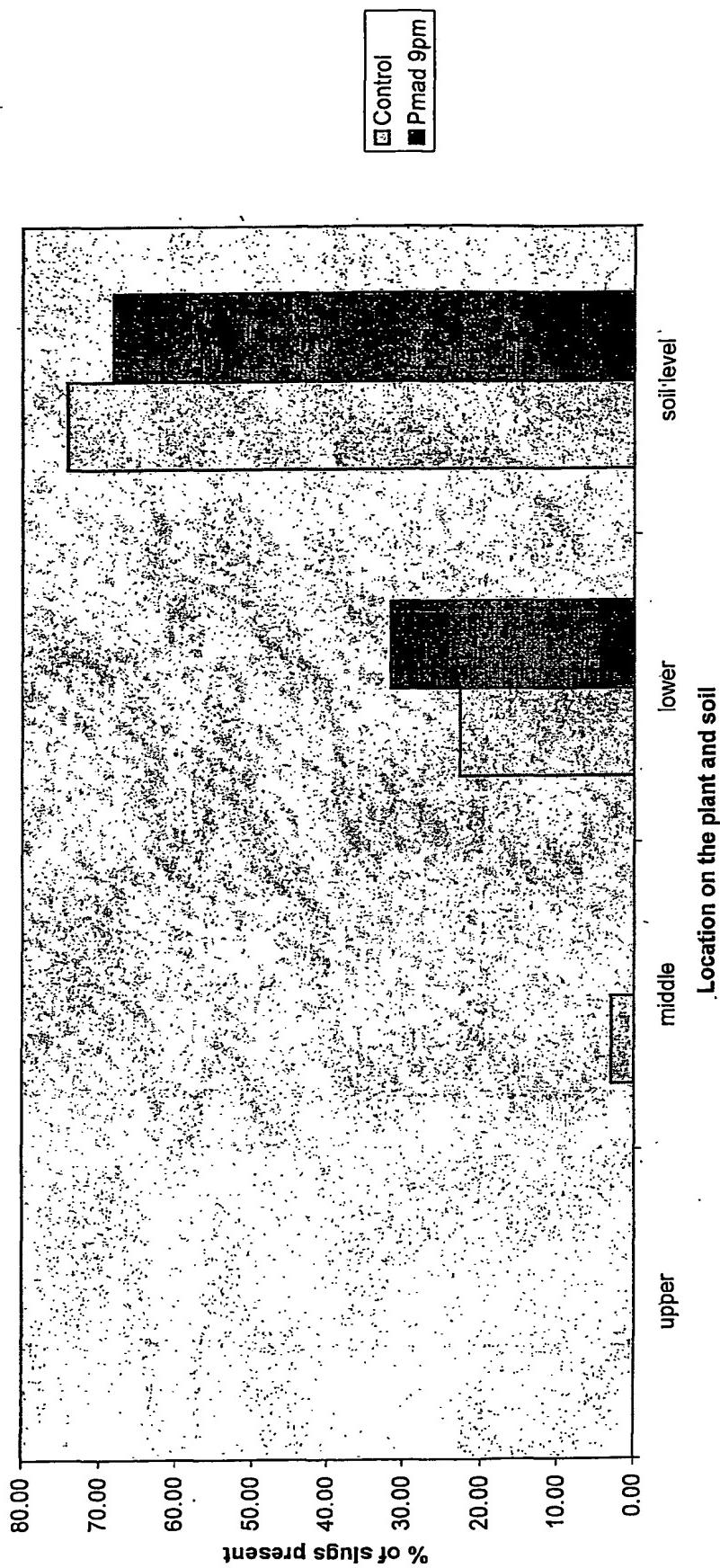
FIG 43

Glasshouse studies on day 1 to show the position of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with beetle formulation of *P. maidis*(methacrylic and tiglic acid)



F16, 44

Glasshouse studies on day 1 to show the position of *D. reticulatum* slugs after a period of 3 hours on pea plants applied with beetle formulation of *P. maidis*(methacrylic acid and tiglic acid)



t/G 45

Glasshouse studies on day 1 to show the position of *D. reticulatum* slugs after a period of 4 hours on pea plants applied with beetle formulation of *P. maidis*(methacrylic and tiglic acid)

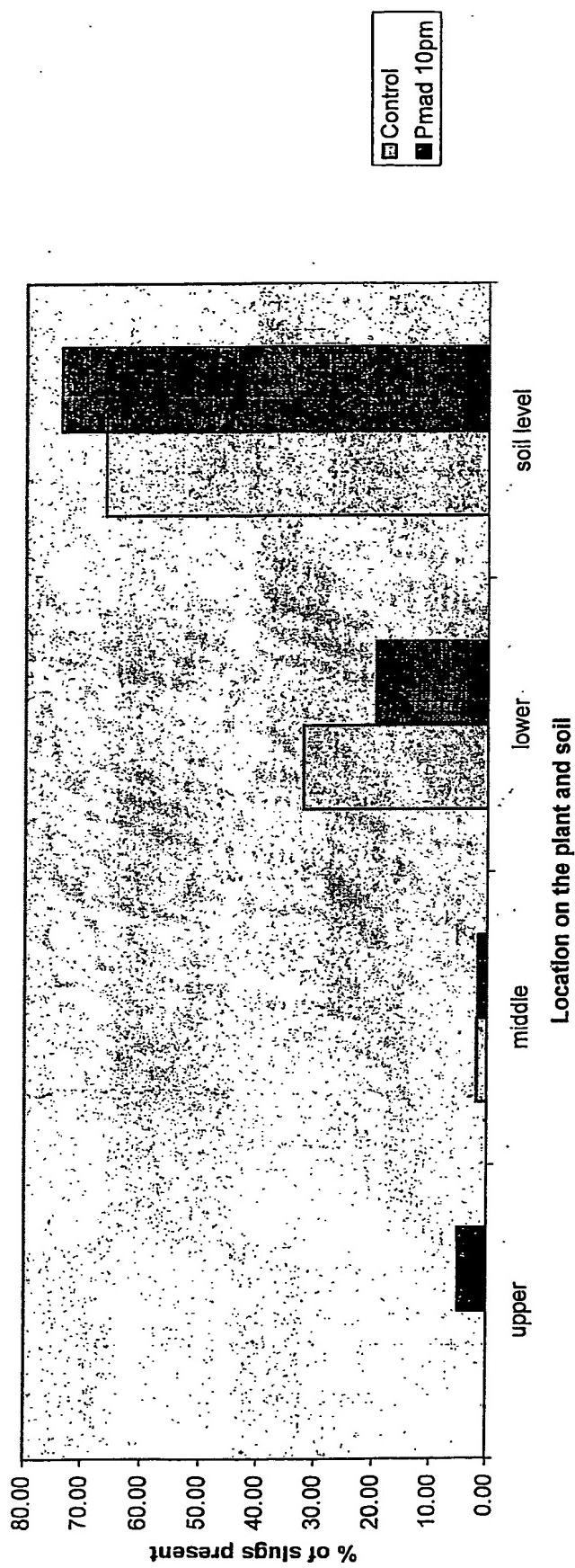


FIG 46

Glasshouse studies on day 1 to show the position of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with methacrylic acid

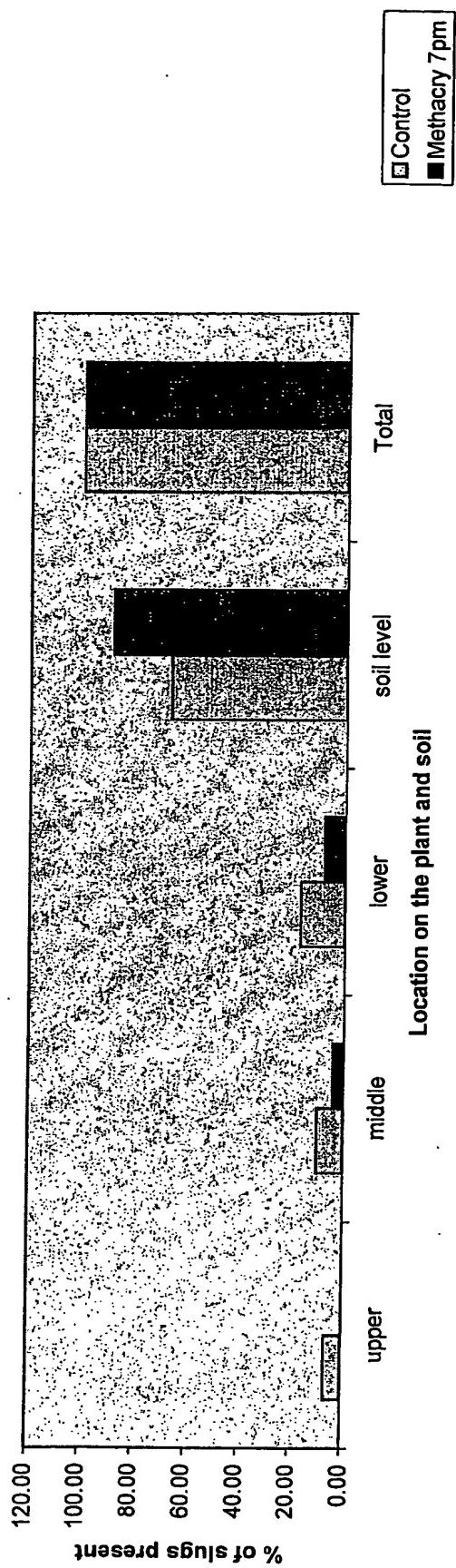


FIG 47

Glasshouse studies on day 1 to show the position of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with methacrylic acid

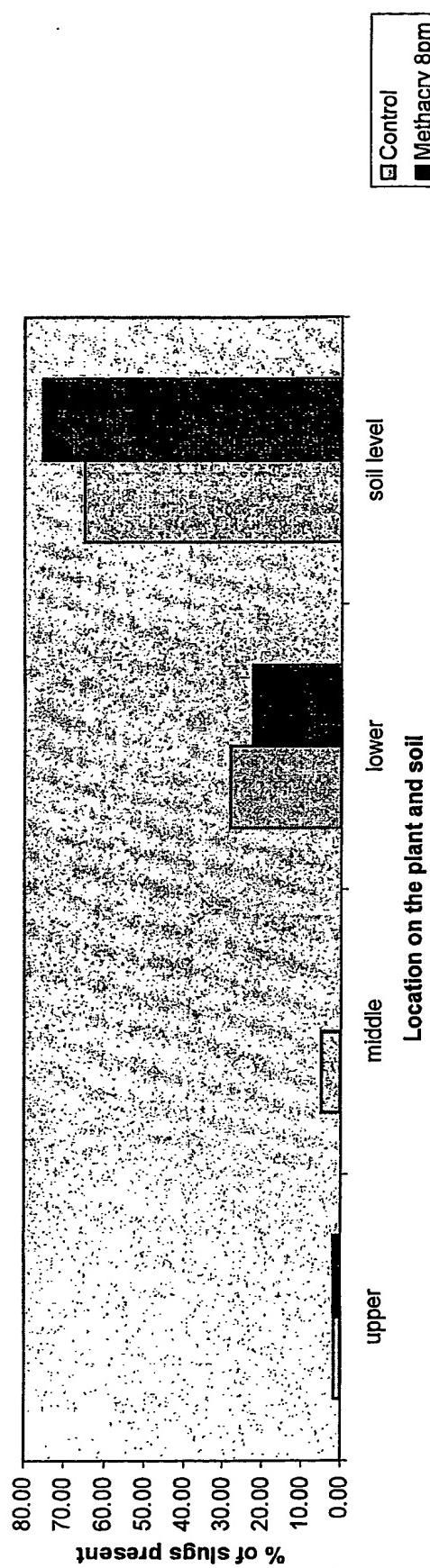


Fig 48

Glasshouse studies on day 1 to show the position of *D. reticulatum* slugs after a period of 3 hours on pea plants applied with methacrylic acid

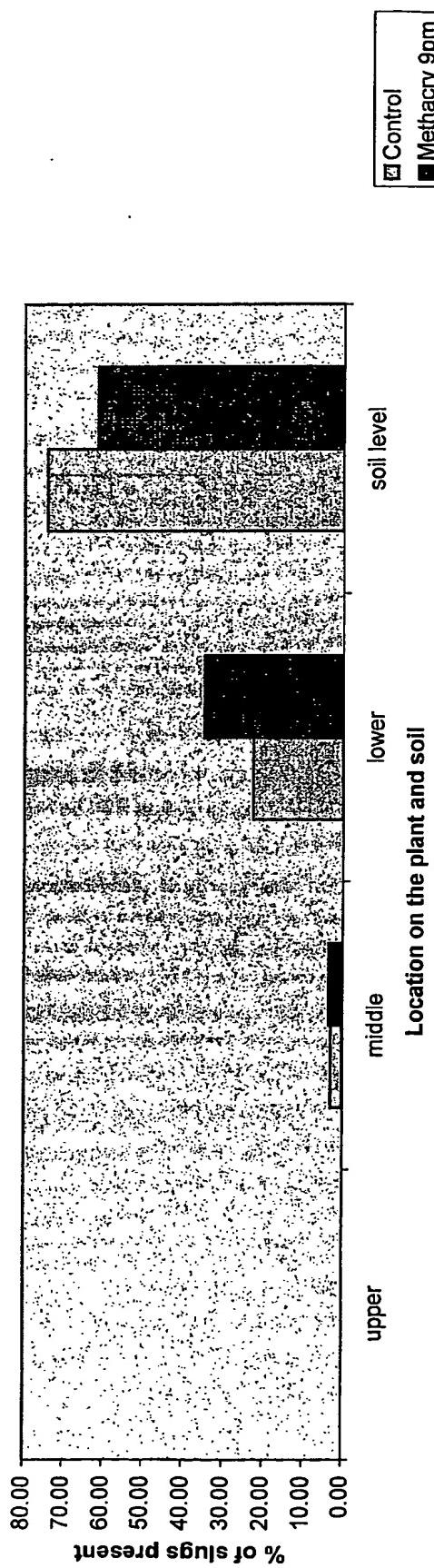


FIG 49

Glasshouse studies on day 1 to show the position of *D. reticulatum* slugs after a period of 4 hours on pea plants applied with methacrylic acid

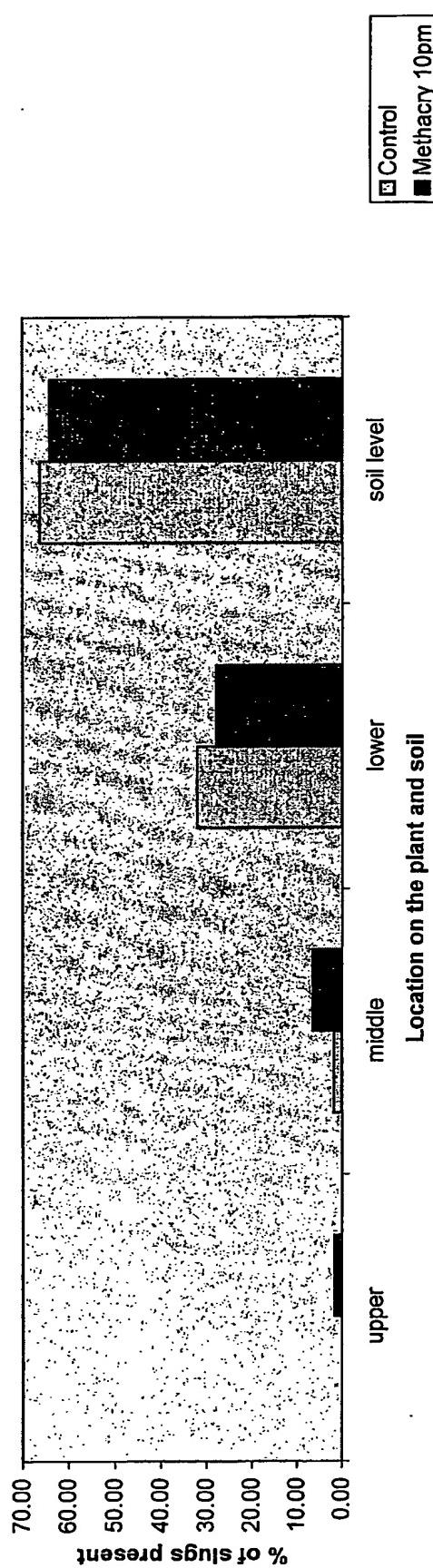


Fig 50

Glasshouse studies on day 2 to show the position of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with beetle formulation of *P. maidis*(methacrylic and tiglic acid)

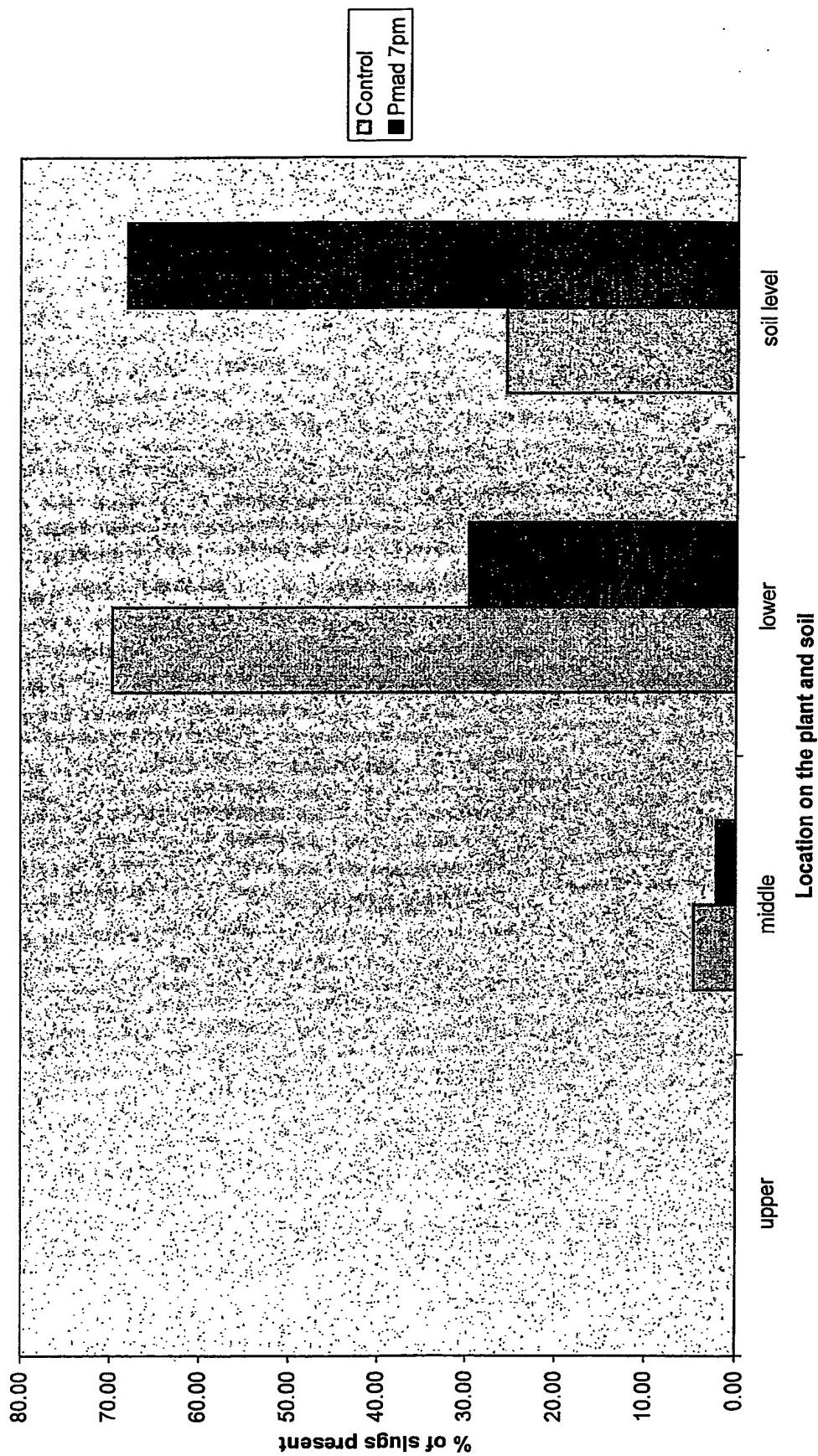


FIG 51

Glasshouse studies on day 2 to show the position of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with beetle formulation of *P. maidis*(methacrylic and tiglic acid)

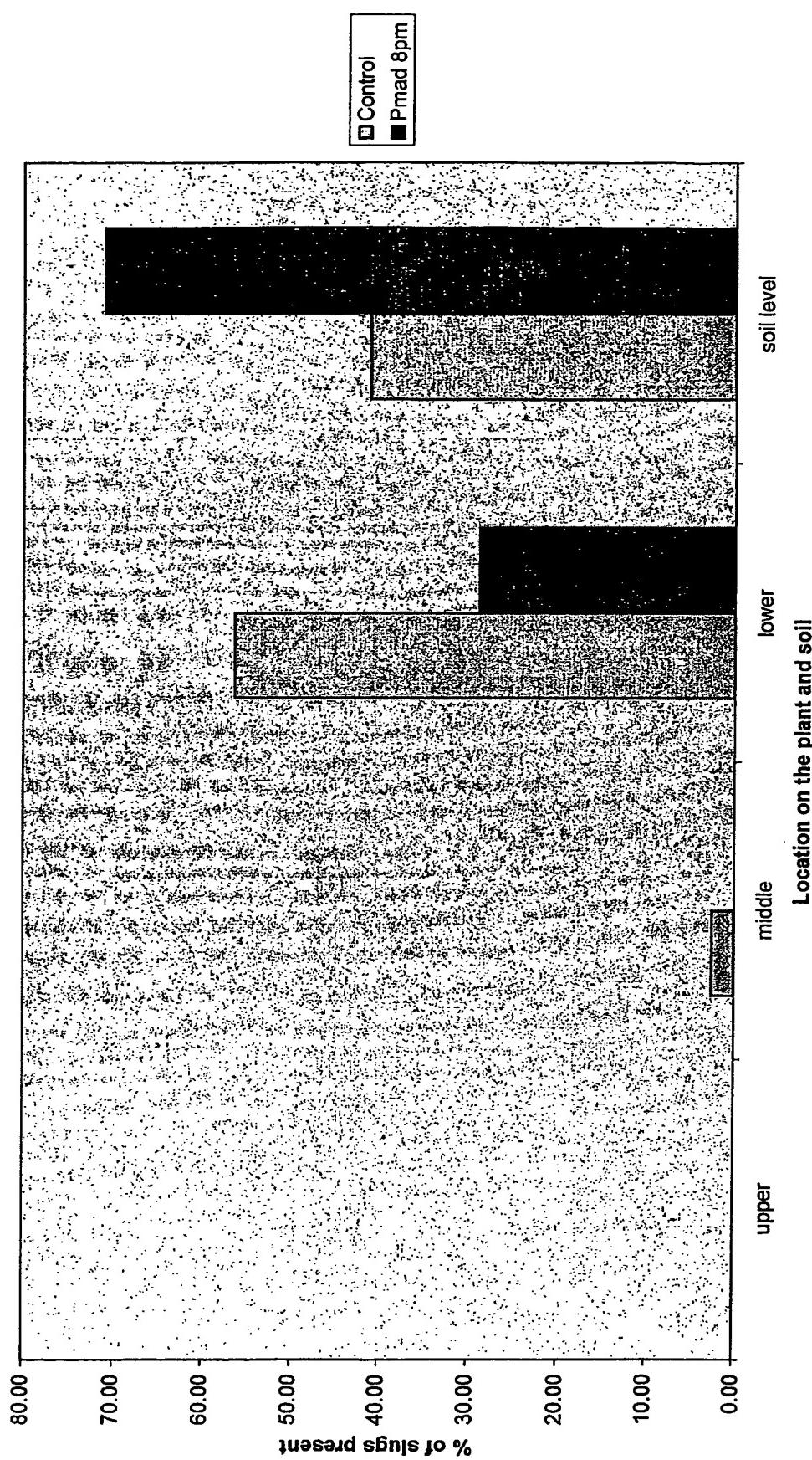


FIG 52

Glasshouse studies on day 2 to show the position of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with methacrylic acid

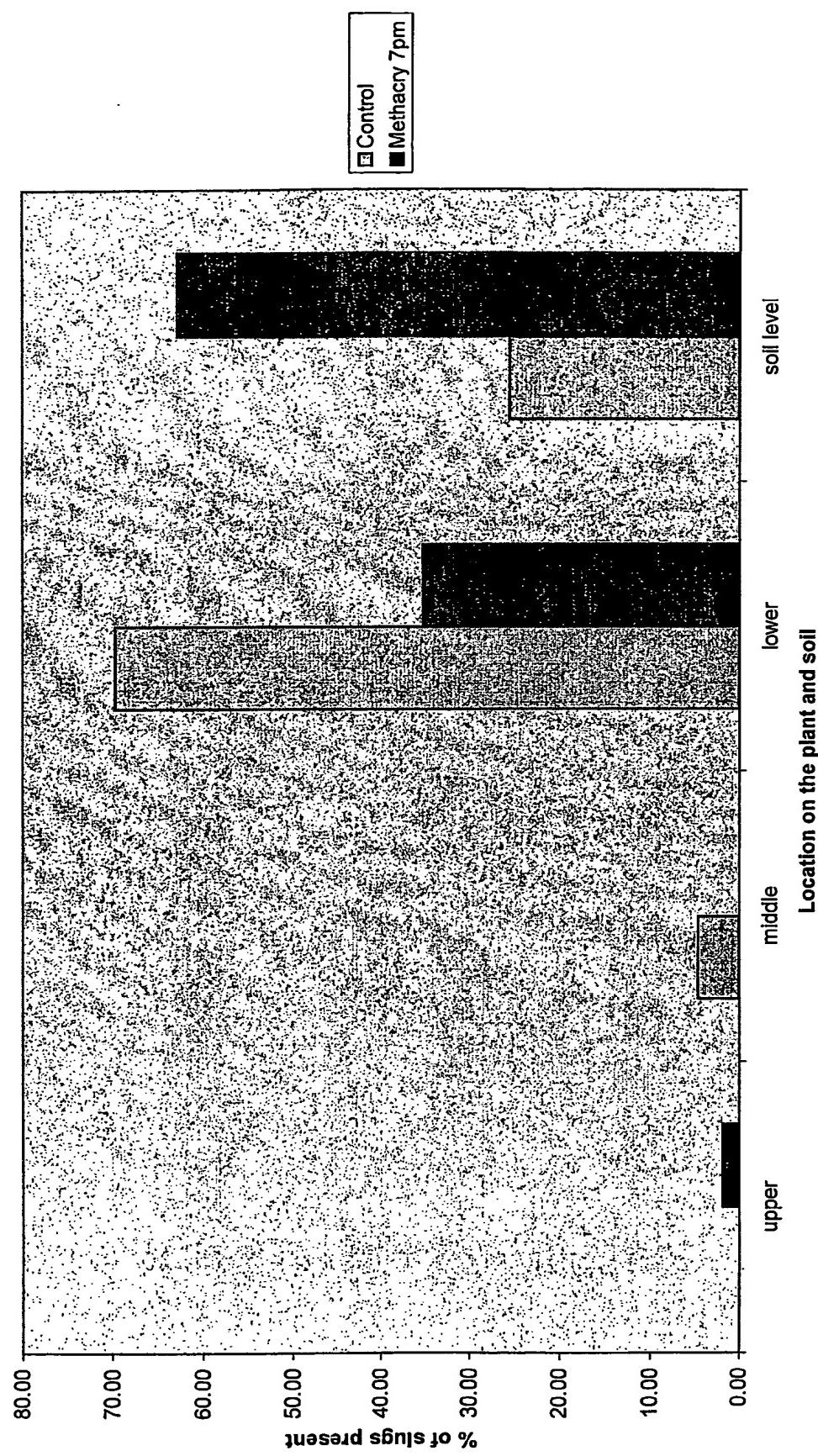


Fig 53

Glasshouse studies on day 2 to show the position of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with methacrylic acid

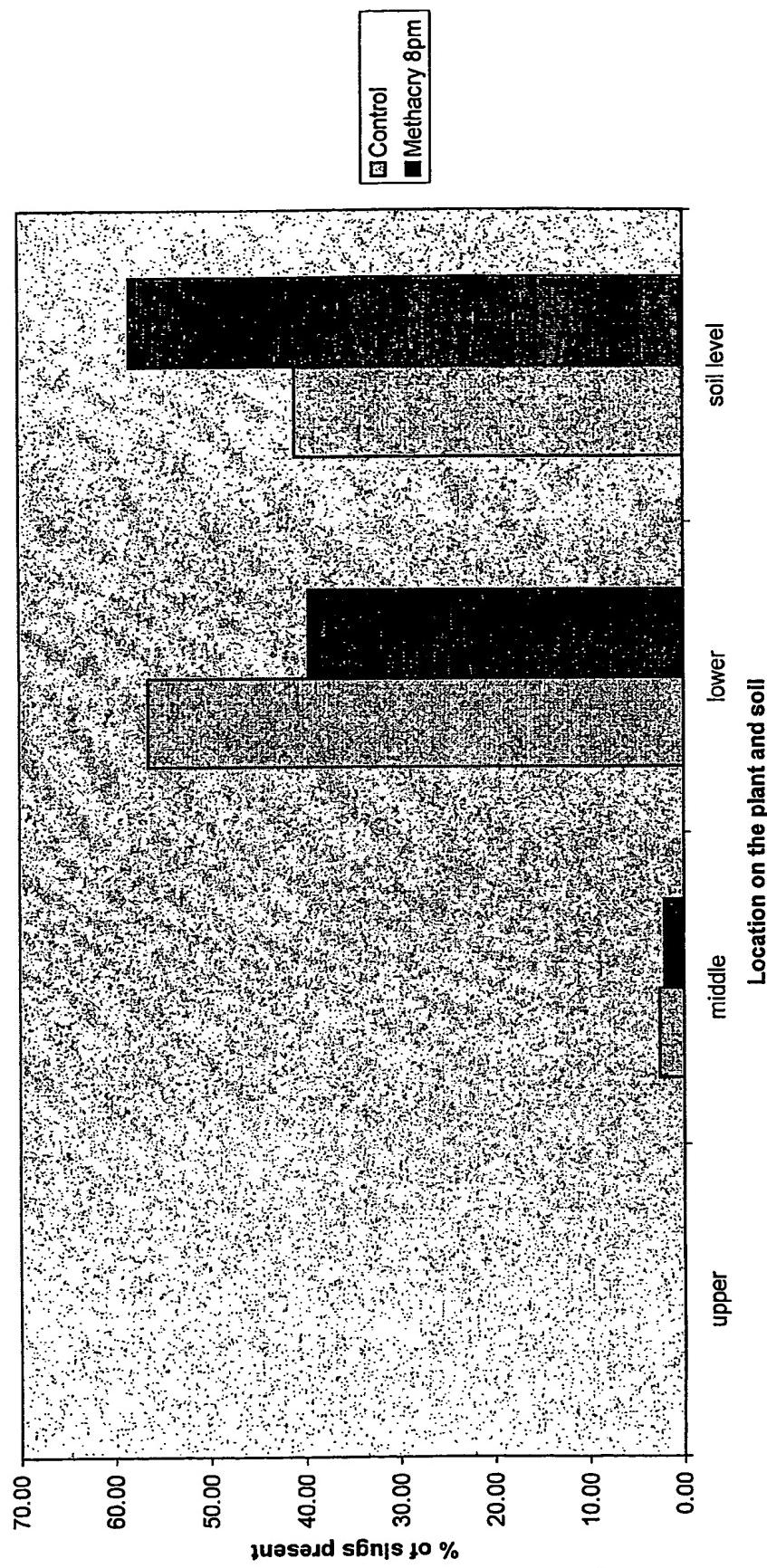


FIG 54

The good news is there is no side effects by these chemicals to show that beetle odours can be promoted to a new slug deterrent

Glasshouse studies on day 5 to show the position of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with beetle formulation of *P. madidus*(methacrylic and tiglic acid)

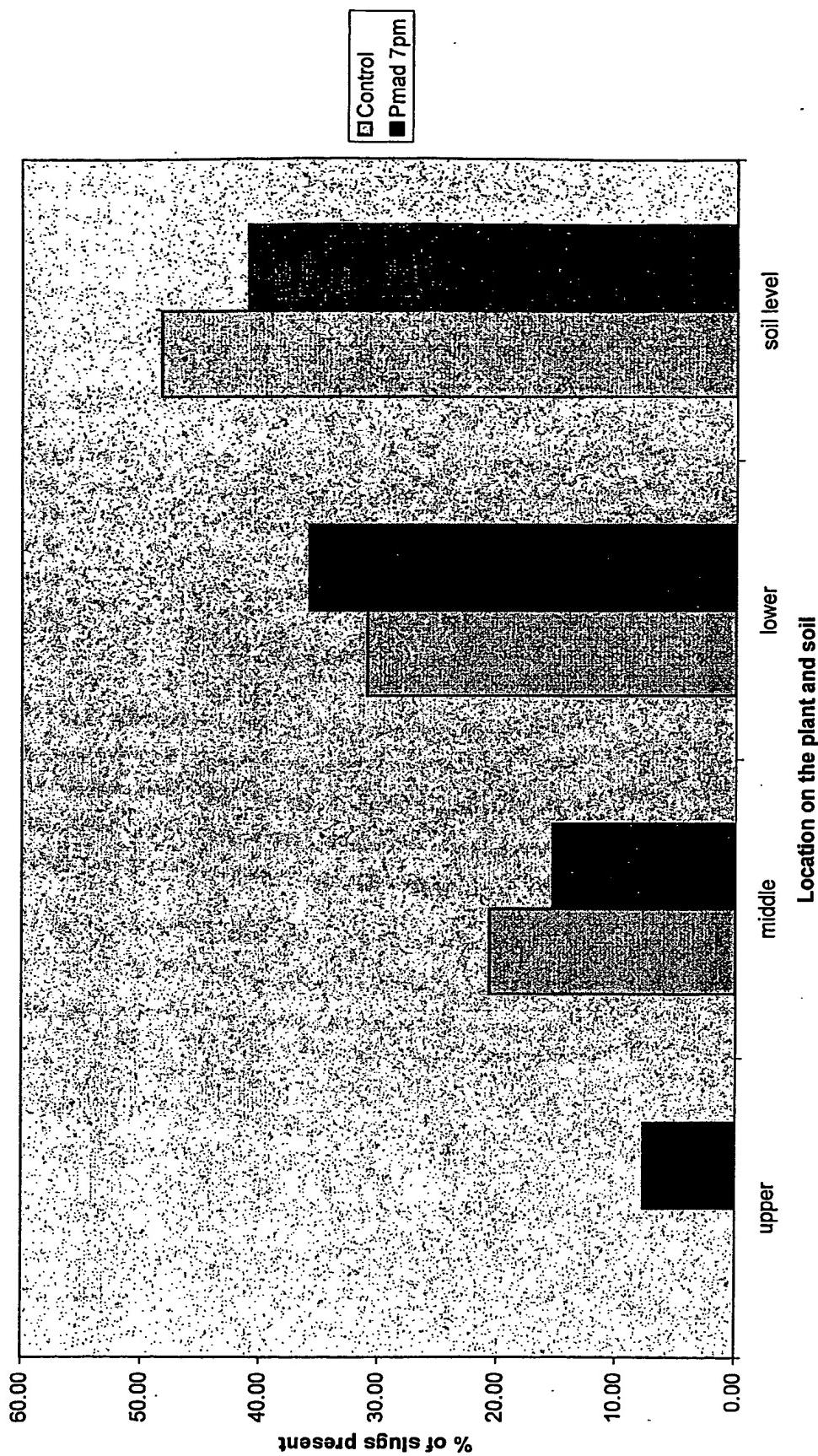


FIG 55

Glasshouse studies on day 5 to show the position of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with beetle formulation of *P. maidis*(methacrylic and tiglic acid)

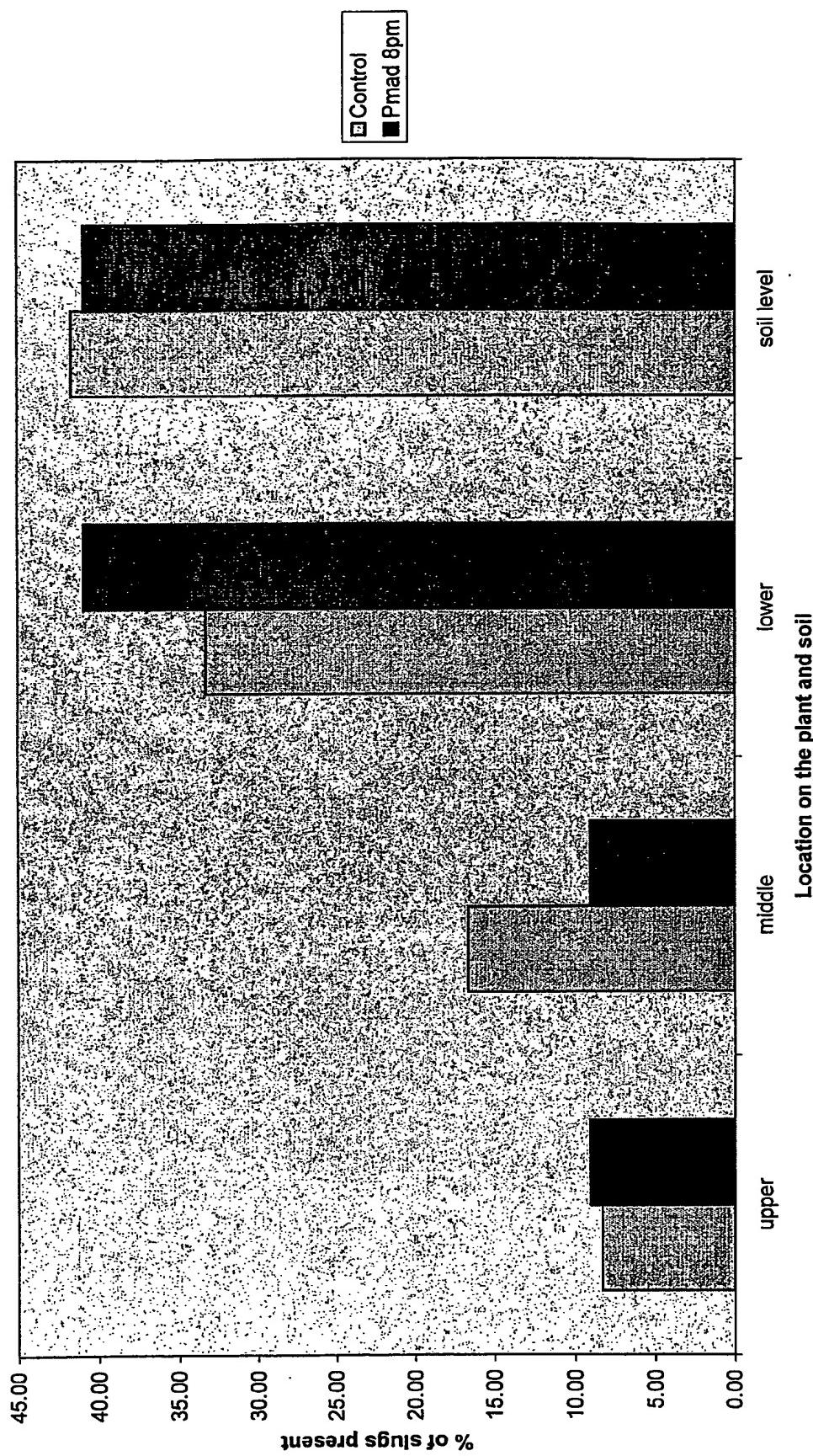


Fig 56

Glasshouse studies on day 5 to show the position of *D. reticulatum* slugs after a period of 3 hours on pea plants applied with beetle formulation of *P. maidis*(methacrylic and tiglic acid)

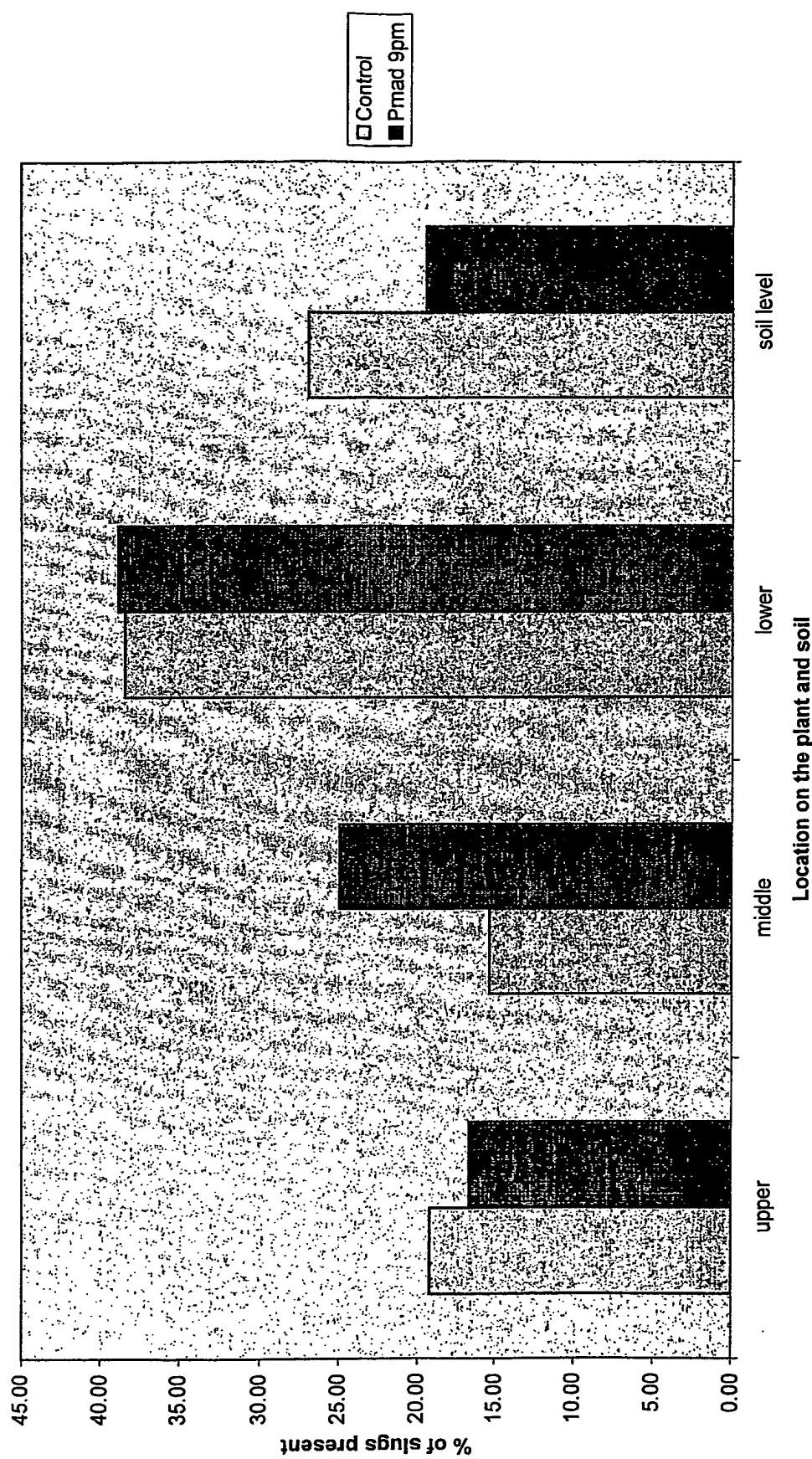
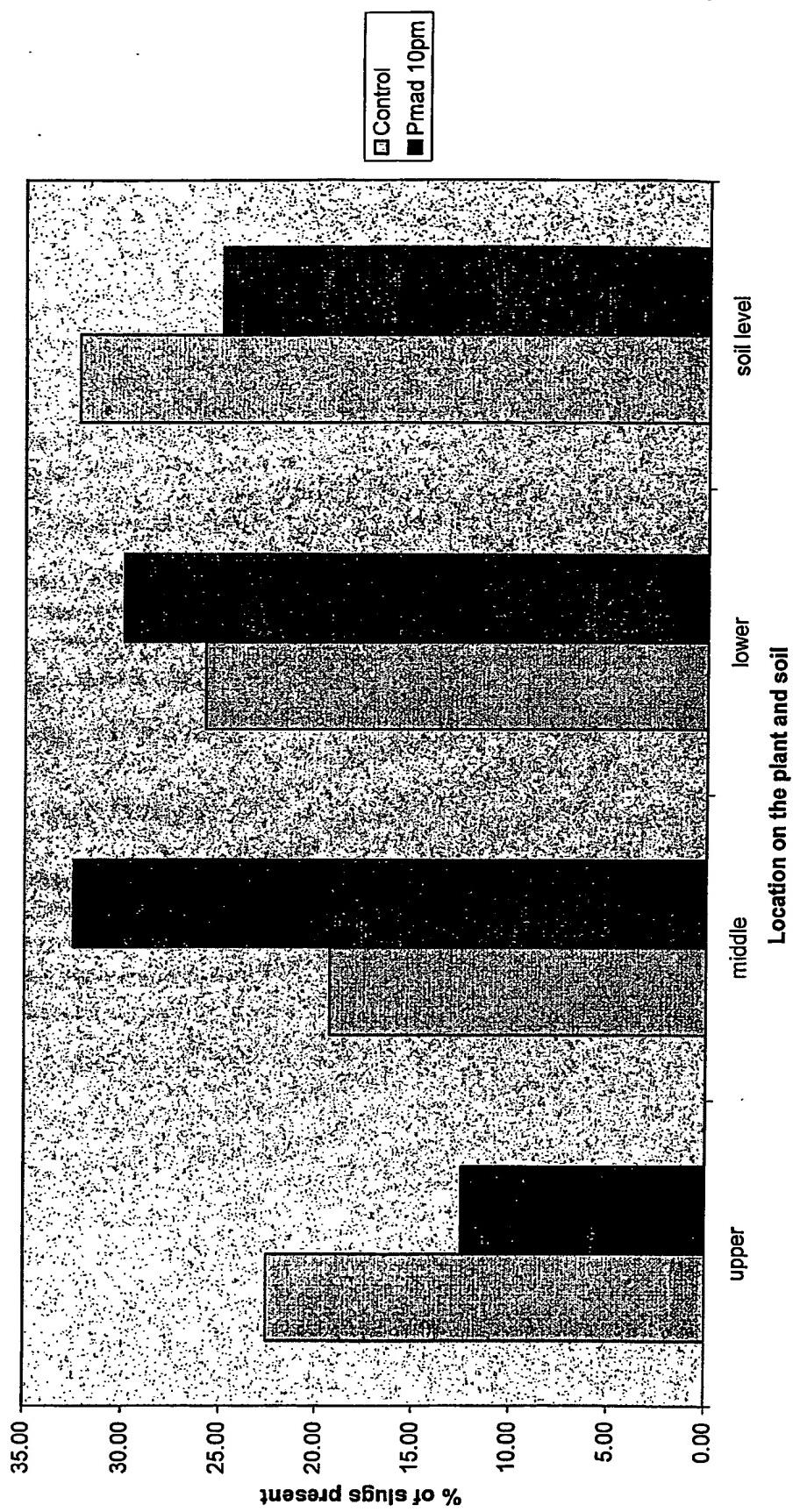


Fig 59

Glasshouse studies on day 5 to show the position of *D. reticulatum* slugs after a period of 4 hours on pea plants applied with beetle formulation of *P. madidus*(methacrylic and tiglic acid)



Glasshouse studies on day 5 to show the position of *D. reticulatum* slugs after a period of 1 hour on pea plants applied with methacrylic acid

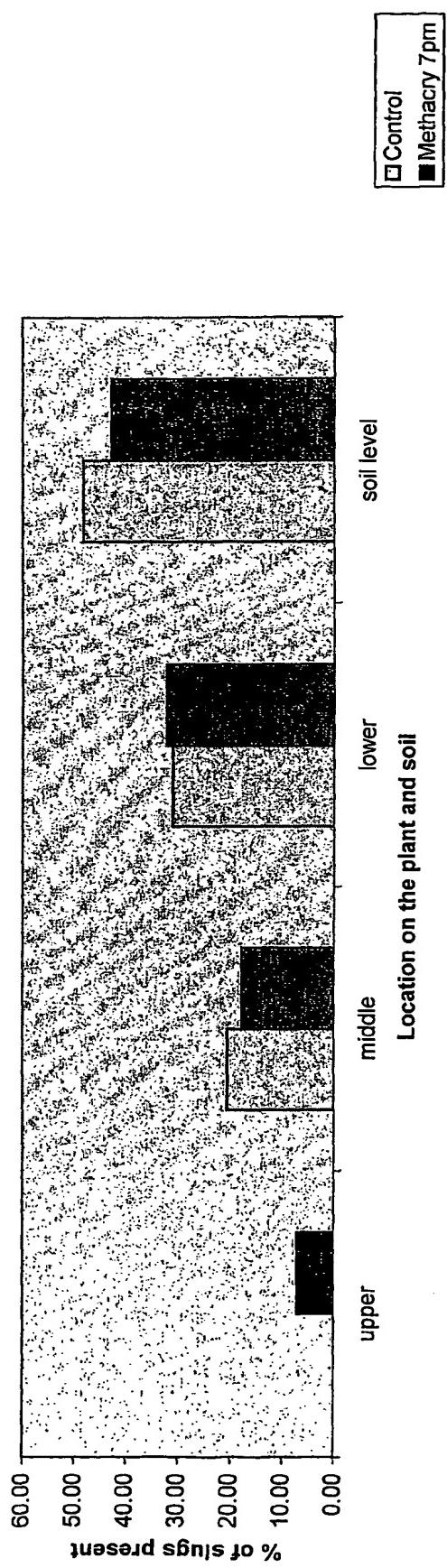


FIG 59

Glasshouse studies on day 5 to show the position of *D. reticulatum* slugs after a period of 2 hours on pea plants applied with methacrylic acid

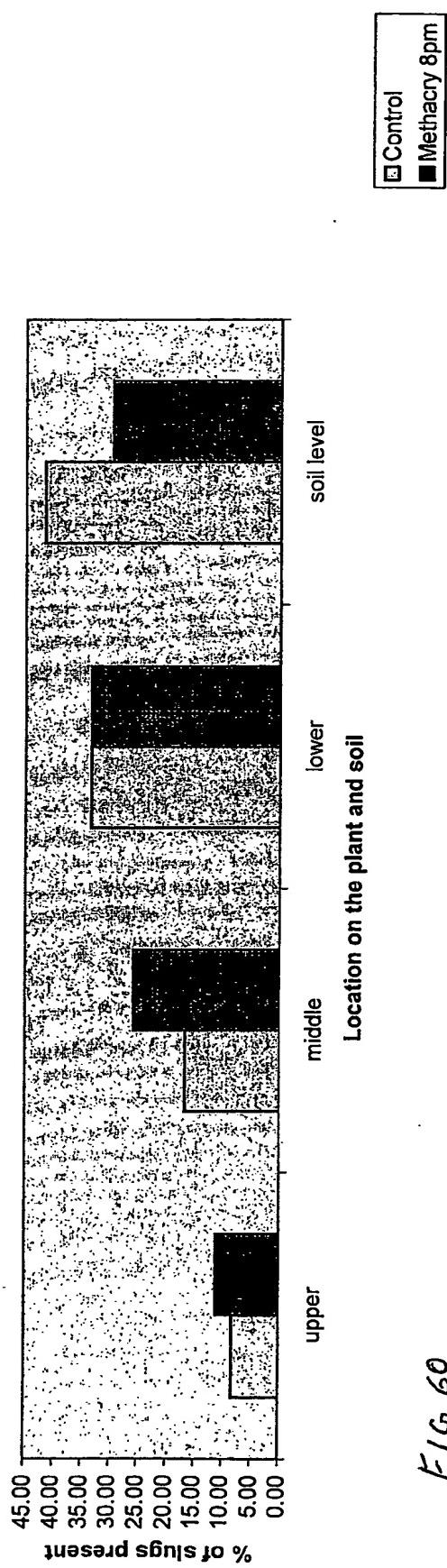


Fig 60

Glasshouse studies on day 5 to show the position of *D. reticulatum* slugs after a period of 3 hours on pea plants applied with methacrylic acid

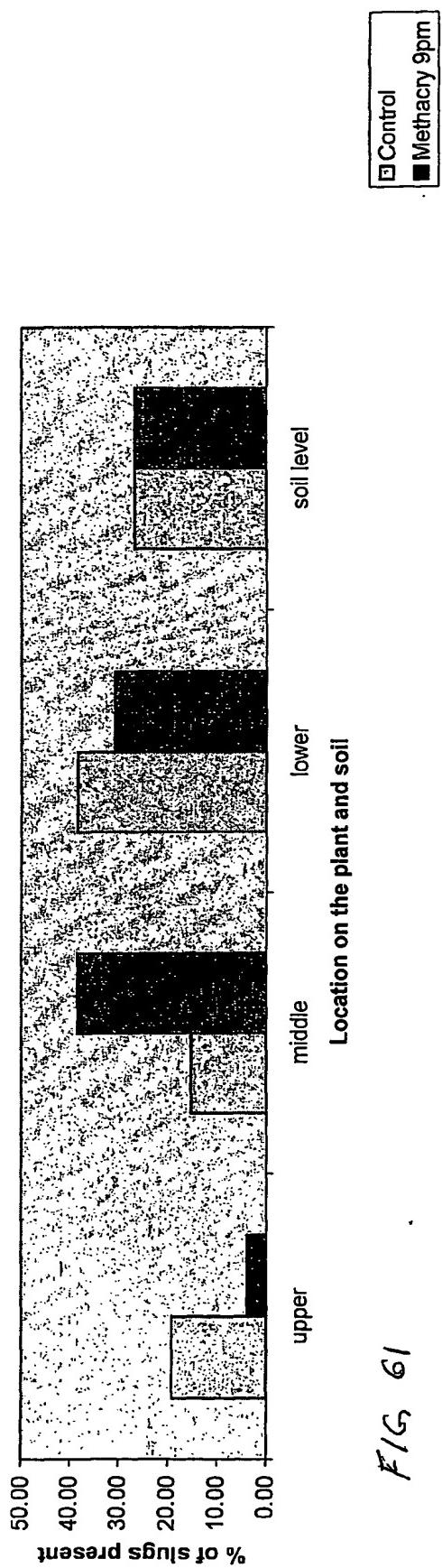


FIG. 61

Glasshouse studies on day 5 to show the position of *D. reticulatum* slugs after a period of 4 hours on pea plants applied with methacrylic acid

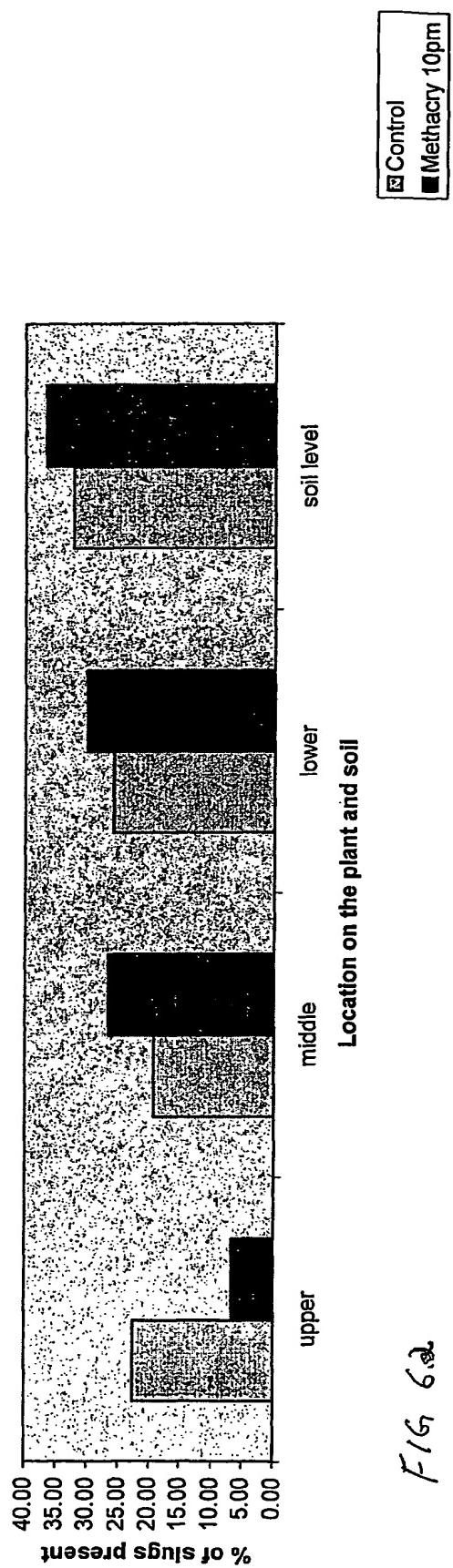


Fig 6.2

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